

STATE OF CALIFORNIA
REGIONAL WATER QUALITY CONTROL BOARD
SAN FRANCISCO BAY REGION

STAFF SUMMARY REPORT
MEETING DATE: February 18, 1998

ITEM: 11

SUBJECT: 1998 WATER QUALITY ASSESSMENT OF IMPAIRED WATER BODIES IN THE SAN FRANCISCO BAY REGION - Hearing to consider staff recommendations for submittal to the State Board

DISCUSSION: Every two years the state is required to report to the USEPA on the status of water quality in the State and provide a list of impaired water bodies (the so-called 303(d) list) where water quality standards are not expected to be met after implementation of technology-based effluent limitations. States are required to establish a priority ranking of these water bodies and to identify the pollutants that cause the exceedances of the water quality standards. Appendix A contains a draft revised 303(d) List of Impaired Water Bodies in the San Francisco Bay Region.

Once the water bodies are listed, the state is required to determine the amount that the pollutants of concern must be reduced to meet the applicable water quality standard or eliminate beneficial use impairment. This allocation of allowable pollutant discharge from various sources is called a total daily mass loading, or TMDL. Preparation of a TMDL is normally a major staff workload.

In other states, and in the North Coast and Santa Ana Regions of California, environmental groups have successfully sued to force the preparation of TMDLs for water bodies listed as impaired. In these cases the TMDL process consists of preparing best management practices for the activities that cause the water quality problems. For example, in the North Coast Region, best management practices are being prepared to minimize siltation from logging.

Clearly, the 303(d) listing of impaired water bodies and the associated TMDL process has emerged as an important forum for addressing water quality issues. In general, dischargers to a given water body tend to oppose its listing, whereas environmentalists may seek the listing of more water bodies for more pollutants. Resolution of such issues may turn on the availability of data. Here it is important to bear in mind that the impaired water bodies listing process is an ongoing one, so that changes can be made, as more data become available.

The TMDL process is the logical way of addressing problems where pollutants, such as mercury, come from many sources, including both point and non-point sources. In this sense, the TMDL process becomes part of watershed management.

The draft revised 303(d) list was developed through review of all readily available water quality data, most of which is focused on Bay segments rather than smaller tributary streams. These data include regular and intensive field surveys of water column, sediment, sediment toxicity, bivalve bioaccumulation, and water toxicity data. In the draft list, changes made since the 1996 version are shown in bold, and changes made most recently compared to the version sent out for public review are shown in bold italic.

The revised list reflects a refinement of the listing of Bay segments. Previously, all segments were listed as impaired due to metals with no further breakdown. We now recommend that the Bay segments be listed specifically for copper, nickel, mercury, selenium, PCBs, diazinon, and exotic species.

A public notice and staff report on the proposed 303(d) list (Appendix B) were made available to interested parties. We have prepared a response to comments received (Appendix C). All comments received are included in Appendix E. Changes to the revised 303(d) list based on comments received are noted in Appendix B. Although many comments were supportive of proposed listings, there were many that conflicted (pro versus con listing).

We received a number of recommendations for listing various creeks in the region. However, we believe it be more desirable to have more data and more time to assess it for the next round of 303(d) listing. Further monitoring and assessment of the listed water bodies may lead to consideration of delisting in some cases.

Staff will work with the State Board and USEPA to resolve a number of remaining issues. These include: the use of watershed management plans as alternatives to TMDLs; how to list do TMDLs when the pollutants are naturally occurring, are found almost everywhere, or are from historical sources; and whether to list a pollutant where there is uncertainty as to whether it causes impairment. We expect that resolution of these issues will result in an improved process.

**RECOMMEN-
DATION:**

Direct the Executive Officer to respond to comments received and transmit revised 303(d) list to the State Water Resources Control Board.

Appendices:

- A - Revised 303(d) and TMDL Priority List
- B - Public Notice and staff report
- C - Response to comments
- D - Correspondence

APPENDIX A

D-035507

1998 303(d) AND TMDL PRIORITY LIST FOR SAN FRANCISCO BAY REGION

Table A1 - Bay Segments

NAME	CAUSES	SOURCES	PRIORITY	SIZE AFFECTED	UNIT	TMDL START	DATE END	COMMENTS
SOUTH SAN FRANCISCO BAY	Mercury	Resource Extraction Nonpoint Source Municipal Point Sources Industrial Point Sources Atmospheric Deposition Natural Sources	High	24,500	Acres	1998	2003	Current data indicate fish consumption and wildlife consumption impacted uses; health consumption advisory in effect for multiple fish species including striped bass and shark; major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources; water objective exceedances, elevated sediment levels, elevated tissue levels.
	Copper	Municipal Point Sources Urban Runoff/Storm Sewers Atmospheric Deposition Other	High	24,500	Acres	1998	2003	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
	Nickel	Municipal Point Sources Urban Runoff/Storm Sewers Other	High	24,500	Acres	1998	2003	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
	<i>Exotic Species</i>	<i>Ballast Water</i>	<i>High</i>	<i>24,500</i>	<i>Acres</i>	<i>1998</i>	<i>2003</i>	<i>Disrupt natural benthos; change pollutant availability in food chain; endanger food availability to native species.</i>
	Pesticides	Agriculture Urban Runoff/Storm Sewers	Medium	24,500	Acres	2000	2005	Diazinon and chlorpyrifos levels cause water column toxicity. Two patterns: pulses through riverine systems linked to agricultural application in late winter and pulse from residential land use areas linked to homeowner pesticide use in late spring, early summer.
	PCEs	Nonpoint sources Unknown	Medium	24,500	Acres	2003	2008	Interim health advisory for fish; uncertainty regarding water column concentration data.
	Selenium	Domestic use of groundwater; Agriculture	Low	24,500	Acres	2008	2010	A formal health advisory has been issued by OEHHA for benthic-feeding ducks in South San Francisco Bay. This health advisory clearly establishes that REC-1 beneficial use is not fully supported and standards are not fully met.

1998 303(d) AND TMDL PRIORITY LIST FOR SAN FRANCISCO BAY REGION

Table A1 - Bay Segments

NAME	CAUSES	SOURCES	PRIORITY	SIZE AFFECTED	UNIT	TMDL START	DATE END	COMMENTS
LOWER SAN FRANCISCO BAY	Mercury	Resource Extraction	High	79,900	Acres	1998	2003	Current data indicate fish consumption and wildlife consumption impacted uses; health consumption advisory in effect for multiple fish species including striped bass and shark; major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources; water objective exceedances, elevated sediment levels, elevated tissue levels
		Nonpoint source						
		Municipal point sources						
		Industrial Point Sources						
		Atmospheric Deposition						
		Natural Sources						
	<i>Exotic Species</i>	<i>Ballast water</i>	<i>High</i>	<i>87,700</i>	<i>Acres</i>	<i>1998</i>	<i>2003</i>	<i>Disrupt natural benthos; change pollutant availability in food chain; endanger food availability to native species.</i>
	Copper	Municipal point sources Urban Runoff/Storm Sewers Atmospheric Deposition Other	Medium	79,900	Acres	2003	2008	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
	Nickel	Municipal point sources Urban Runoff/Storm Sewers Atmospheric Deposition Other	Medium	79,900	Acres	2003	2008	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
	Pesticides	Agriculture Urban Runoff/Storm Sewers	Medium	79,900	Acres	2000	2005	Diazinon and chlorpyrifos levels cause water column toxicity. Two patterns: pulses through riverine systems linked to agricultural application in late winter and pulse from residential land use areas linked to homeowner pesticide use in late spring, early summer.
	<i>PCBs</i>	<i>Nonpoint sources Unknown</i>	<i>Medium</i>	<i>24,500</i>	<i>Acres</i>	<i>2003</i>	<i>2008</i>	<i>Interim health advisory for fish; uncertainty regarding water column concentration data.</i>

1998 303(d) AND TMDL PRIORITY LIST FOR SAN FRANCISCO BAY REGION

Table A1 - Bay Segments

NAME	CAUSES	SOURCES	PRIORITY	SIZE AFFECTED	UNIT	TMDL DATE START	END	COMMENTS
CENTRAL SAN FRANCISCO BAY	Mercury	Resource Extraction	High	67,700	Acres	1998	2003	Current data indicate fish consumption and wildlife consumption impacted uses; health consumption advisory in effect for multiple fish species including striped bass and shark; major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources
		Nonpoint Source						
		Municipal Point Sources						
		Industrial Point Sources						
		Atmospheric Deposition						
		Natural Sources						
	<i>Exotic Species</i>	<i>Ballast water</i>	<i>High</i>	<i>67,700</i>	<i>Acres</i>	<i>1998</i>	<i>2003</i>	<i>Disrupt natural benthos; change pollutant availability in food chain; endanger food availability to native species.</i>
	Copper	Municipal Point Sources	Medium	67,700	Acres	2003	2008	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
		Urban Runoff/Storm Sewers						
		Atmospheric Deposition						
		Other						
	Pesticides	Agriculture	Medium	67,700	Acres	2000	2005	Diazinon and chlorpyrifos levels cause water column toxicity. Two patterns: pulses through riverine systems linked to agricultural application in late winter and pulse from residential land use areas linked to homeowner pesticide use in late spring, early summer.
		Urban Runoff/Storm Sewers						
	PCBs	Nonpoint	Medium	67,700	Acres	2003	2008	Interim health advisory for fish; uncertainty regarding water column concentration data.
		Unknown						
	Selenium	Industrial Point Sources	Low	67,700	Acres	2006	2010	Affected use is one branch of the food chain; most sensitive indicator is hatchability in nesting diving birds; significant contributions from oil refineries (control program in place) and agriculture (carried downstream by rivers); exotic species may have made food chain more susceptible to accumulation of selenium; health consumption advisory in effect for scaup and scoter (diving ducks); low TMDL priority because Individual Control Strategy in place
		Agriculture						
		Exotic Species						
		Natural Sources						

1998 303(d) AND TMDL PRIORITY LIST FOR SAN FRANCISCO BAY REGION

Table A1 - Bay Segments

NAME	CAUSES	SOURCES	PRIORITY	SIZE		TMDL DATE		COMMENTS
				AFFECTED	UNIT	START	END	
RICHARDSON BAY	Mercury	Resource Extraction	High	2,560	Acres	1998	2003	Current data indicate fish consumption and wildlife consumption impacted uses; health consumption advisory in effect for multiple fish species including striped bass and shark; major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources
		Nonpoint source						
		Municipal point sources						
		Atmospheric Deposition Natural Sources						
	<i>Exotic Species</i>	<i>Ballast water</i>	<i>High</i>	<i>2,560</i>	<i>Acres</i>	<i>1998</i>	<i>2003</i>	<i>Disrupt natural benthos; change pollutant availability in food chain; endanger food availability to native species.</i>
	<i>PCBs</i>	<i>Nonpoint Unknown</i>	<i>Medium</i>	<i>2,560</i>	<i>Acres</i>	<i>2003</i>	<i>2008</i>	<i>Interim health advisory for fish; uncertainty regarding water column concentration data.</i>
	Coliform	Septage Disposal Urban Runoff/Storm Sewers Boat Discharge/Vessel Wastes	Medium	200	Acres	2003	2008	Affected area, Waldo Point Harbor, is less than 10% of embayment; source has been positively identified as substandard sewage systems in some houseboat areas; extensive local control program in place with significant water quality

1998 303(d) AND TMDL PRIORITY LIST FOR SAN FRANCISCO BAY REGION

Table A1 - Bay Segments

NAME	CAUSES	SOURCES	PRIORITY	SIZE AFFECTED	UNIT	TMDL DATE START	END	COMMENTS
SAN PABLO BAY	Mercury	Resource Extraction Nonpoint Source Municipal point sources Atmospheric Deposition Natural Sources	High	71,300	Acres	1998	2003	Current data indicate fish consumption and wildlife consumption impacted uses; health consumption advisory in effect for multiple fish species including striped bass and shark; major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources
	<i>Exotic Species</i>	<i>Ballast Water</i>	<i>High</i>	<i>71,300</i>	<i>Acres</i>	<i>1998</i>	<i>2003</i>	<i>Disrupt natural benthos; change pollutant availability in food chain; disrupt food availability in native species.</i>
	Copper	Municipal Point Sources Urban Runoff/Storm Sewers Atmospheric Deposition Other	Medium	71,300	Acres	2003	2008	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
	Pesticides	Agriculture Urban Runoff/Storm Sewers	Medium	71,300	Acres	2000	2005	Diazinon and chlorpyrifos levels cause water column toxicity. Two patterns: pulses through riverine systems linked to agricultural application in late winter and pulse from residential land use areas linked to homeowner pesticide use in late spring, early summer
	PCBs	Nonpoint Source Unknown	Medium	71,300	Acres	2003	2008	Interim health advisory for fish; uncertainty regarding water column concentration data.
	Selenium	Industrial Point Sources Agriculture Exotic Species Natural Sources	Low	71,300	Acres	2006	2010	Affected use is one branch of the food chain; most sensitive indicator is hatchability in nesting diving birds; significant contributions from oil refineries (control program in place) and agriculture (carried downstream by rivers); exotic species may have made food chain more susceptible to accumulation of selenium; health consumption advisory in effect for scaup and scoter (diving ducks); low TMDL priority because Individual Control Strategy in place.

1998 303(d) AND TMDL PRIORITY LIST FOR SAN FRANCISCO BAY REGION

Table A1 - Bay Segments

NAME	CAUSES	SOURCES	PRIORITY	SIZE AFFECTED	UNIT	TMDL START	DATE END	COMMENTS
CARQUINEZ STRAIT	Mercury	Resource Extraction Nonpoint Source Municipal Point Sources Industrial Point Sources Natural Sources	High	25,000	Acres	1998	2003	Current data indicates fish consumption and wildlife consumption impacted uses; major source is historic gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources.
	<i>Exotic Species</i>	<i>Ballast water</i>	<i>High</i>	<i>25,000</i>	<i>Acres</i>	<i>1998</i>	<i>2003</i>	<i>Disrupt natural benthos; change pollutant availability in food chain; disrupt food availability in native species.</i>
	Copper	Municipal Point Sources Urban Runoff/Storm Sewers Atmospheric Deposition Other	Medium	25,000	Acres	2003	2008	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
	Pesticides	Agriculture Urban Runoff/Storm Sewers	Medium	25,000	Acres	2000	2005	Diazinon and chlorpyrifos levels cause water column toxicity. Two patterns: pulses through riverine systems linked to agricultural application in late winter and pulse from residential land use areas linked to homeowner pesticide use in late spring, early summer.
	<i>PCBs</i>	<i>Nonpoint Unknown</i>	<i>Medium</i>	<i>25,000</i>	<i>Acres</i>	<i>2003</i>	<i>2008</i>	<i>Interim health advisory for fish; uncertainty regarding water column concentration data.</i>
	Selenium	Industrial Point Sources Agriculture Exotic Species	Low	25,000	Acres	2006	2010	Affected use is one branch of the food chain; most sensitive indicator is hatchability in nesting diving birds; significant contributions from oil refineries (control program in place) and agriculture (carried downstream by rivers); exotic species may have made food chain more susceptible to accumulation of selenium; health consumption advisory in effect for scaup and scoter (diving ducks); low TMDL priority because local Individual Control Strategies program in place.

1998 303(d) AND TMDL PRIORITY LIST FOR SAN FRANCISCO BAY REGION

Table A1 - Bay Segments

NAME	CAUSES	SOURCES	PRIORITY	SIZE		TMDL DATE		COMMENTS
				AFFECTED	UNIT	START	END	
DELTA	<i>Exotic Species</i>	<i>Ballast water</i>	<i>High</i>	<i>15,000</i>	<i>Acres</i>	<i>1998</i>	<i>2003</i>	<i>Disrupt natural benthos; change pollutant availability in food chain; disrupt food availability in native species.</i>
	Mercury	Resource Extraction Nonpoint Source Municipal Point Sources Industrial Point Sources Atmospheric Deposition	High	15,000	Acres	1998	2003	Current data indicate fish consumption and wildlife consumption impacted uses; major source is historic gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources.
	Copper	Municipal Point Sources Urban Runoff/Storm Sewers Atmospheric Deposition Other	Medium	15,000	Acres	2003	2008	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
	Pesticides	Agriculture Urban Runoff/Storm Sewers	Medium	15,000	Acres	2000	2005	Diazinon and chlorpyrifos levels cause water column toxicity. Two patterns: pulses through riverine systems linked to agricultural application in late winter and pulse from residential land use areas linked to homeowner pesticide use in late spring, early summer
	PCBs	Nonpoint Unknown	Medium	15,000	Acres	2003	2008	Interim health advisory for fish; uncertainty regarding water column concentration data.
	Selenium	Industrial Point Sources Agriculture Exotic Species Natural Sources	Low	15,000	Acres	2006	2010	Affected use is one branch of the food chain; most sensitive indicator is hatchability in nesting diving birds; significant contributions from oil refineries (control program in place) and agriculture (carried downstream by rivers); exotic species may have made food chain more susceptible to accumulation of selenium; health consumption advisory in effect for sculpin and scoter (diving ducks); low TMDL priority because local individual Control Strategies program in place.

APPENDIX B

D-035515

**San Francisco Bay Regional Water Quality Control Board**
2101 Webster Street, Suite 500, Oakland, CA 94612 (510) 286-1255 Fax: 286-1380**NOTICE OF PUBLIC HEARING****TO CONSIDER ADOPTION OF
THE 1998 WATER QUALITY ASSESSMENT
OF THE 303(d) LIST OF IMPAIRED WATER BODIES
FOR THE SAN FRANCISCO BAY REGION**

DATE: FEBRUARY 18, 1998
TIME: 9:30 A.M.
PLACE: BART Headquarters Building
First Floor Board Room
800 Madison Street
Oakland, CA 94607

Notice is hereby given that the California Regional Water Quality Control Board, San Francisco Bay Region, will hold a public hearing to solicit comments on the proposed update of the Regional Water Quality Assessment of the 303(d) list of impaired water bodies within the San Francisco Bay Region. This list is reviewed by the Regional Board every two years in accordance with state and federal laws and requirements.

The Federal Clean Water Act requires that States develop a list of impaired water bodies that need additional work beyond existing controls to achieve or maintain water quality standards. This list is based on the State's water quality assessment database. The list is used to prioritize the water bodies for development of studies that identify the relative contributions of each pollutant or impairment source and specify the means to attain water quality standards. The San Francisco Bay Regional Water Quality Control Board has developed the attached draft (303d) impaired water body list for the waterbodies in its region. Please submit written comments on the list no later than February 2, 1998. Responses to comments received by this date will be available at the Regional Board meeting on February 18, 1998. Late comments will be forwarded to the Regional Board to be considered along with oral presentations made at the Public Hearing before the Regional Board. Comments may also be made directly to the Regional Board when it considers this list at its February 18, 1998, meeting. The Regional Board is scheduled to consider adoption of the updated 303(d) list after completion of the Public Hearing.

A staff report explaining which water bodies are being considered for inclusion on the 303(d) list and the reasons for the proposed listing is attached. Written comments on the proposed listing should be sent to this Regional Board at the above address. Questions on this issue should be directed to Tom Mumley at (510) 286-0962.

*Our mission is to preserve and enhance the quality of the water resources of the
San Francisco Bay Region for the benefit of present and future generations*

STAFF REPORT

PROPOSED REVISIONS TO SECTION 303(d) LIST AND PRIORITIES FOR DEVELOPMENT OF TOTAL MAXIMUM DAILY LOADS (TMDLs) FOR THE SAN FRANCISCO BAY REGION

January 7, 1998

**California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster St., Suite 500
Oakland, CA 94612**

Contact Person:

Thomas Mumley, Senior Water Resources Control Engineer

Telephone: (510) 286-0962

Email: tem@rb2.swrcb.ca.gov

INTRODUCTION

Section 303(d) of the federal Clean Water Act (CWA) requires states to identify specific water bodies where water quality standards are not expected to be met after implementation of technology-based effluent limitations. States are required to establish a priority ranking of these water bodies and should also identify the pollutant stressors that cause the exceedances of the water quality standards. Once listed, the state is required to conduct a process for designing, allocating, and implementing water quality based effluent limitations that will ensure attainment of water quality standards--this process is known as a TMDL or Total Maximum Daily Load. The 303(d) list of impaired water bodies and priority ranking is reviewed and updated every two years. The last review and update occurred in February 1996. (See attached 1996-303(d) List.) This staff report summarizes the proposed 1998-303(d) list for water bodies, specific pollutant stressors, and priority for completing TMDLs for water bodies within the San Francisco Bay Region.

The proposed 1998-303(d) list was developed during a comprehensive water quality assessment process (fulfilling the state's obligations under section 305(b) of the CWA). This assessment process began with a review of all readily available water quality data--most of which is focused on Bay segments due the ongoing collection of information by the Regional Monitoring Program. These data include regular and intensive field surveys of water column, sediment, sediment toxicity, bivalve bioaccumulation, and water toxicity data as well as ancillary data on factors such as flows, primary productivity, and sediment fluxes throughout the Bay.

Little or no new data are readily available for other water bodies in the Region. However, we intend to make improved monitoring and assessment a high priority over the next two years which will allow for a much more comprehensive review for the next update expected in 2000. Also, existing and planned watershed management efforts will provide opportunities for improved monitoring and assessment.

In the 305(b) water quality assessment process, a number of stressors were identified as affecting beneficial uses in San Francisco Bay segments. These included:

Lower and South San Francisco Bay: arsenic, cadmium, chromium, copper, lead, nickel, silver, zinc, selenium, PCBs, PAHs, dieldrin, chlordanes, DDTs, heptachlor, diazinon, chlorpyrifos, and flow alterations;

Central, Richardson, San Pablo, and Suisun Bays, Carquinez Strait, and the Delta: arsenic, cadmium, chromium, copper, lead, nickel, silver, zinc, selenium, PCBs, PAHs, dieldrin, chlordanes, DDTs, heptachlor, diazinon, chlorpyrifos, flow alterations, habitat alteration, and exotic species.

The second step in the assessment process was to compile available information on the level of effects associated with each stressor, sources of the pollutant/ stressor (in order of importance), which specific uses were affected, and the effectiveness of local water quality regulatory

requirements in addressing discharge of these pollutants. The information compiled during this review is available to interested parties.

This second step resulted in identification of three general situations. The first general situation is where identified water quality problems have already been addressed by local regulatory programs, including water quality-based effluent limitations. For example, selenium levels in duck tissue in the northern Bay segments are being addressed by Individual Control Strategies (required under the 304(l) "short list") that contain water quality based effluent limits for petroleum refineries. In another case, silver levels in South San Francisco Bay have been significantly reduced as a result of local pollution prevention programs.

The second general situation was where there was insufficient information available to determine if a TMDL process would afford better water quality protection than existing local requirements for water quality-based effluent limitations and Best Management Practices. For example, PCB levels in fish tissue are high throughout the Bay, but current data suggest that these levels are due to historic and not ongoing discharges. Consequently, a TMDL process would not result in the attainment of standards. Another example of such a situation is in the northern segments of San Francisco Bay where beneficial uses are impaired due to changes in the riverine flow regimes. Flow standards that would provide for the protection of beneficial uses are being developed through cooperative state and federal programs--a regional TMDL process would not address this impairment.

The third general situation identified was when specific water bodies and specific stressors for which a full TMDL process is technically feasible, would likely result in different effluent limitations than are currently provided by the Basin Plan, and through implementation of new load and wasteload allocations, would result in the attainment of water quality standards.

Only those water bodies and stressors in the third general category have been included in the final 303(d) list. It is important to note that in most cases, local regulatory requirements are much more stringent than the federal technology based requirements, and always require attainment of water quality standards in the effluent (or in effluent diluted up to ten-fold by receiving waters). In lieu of listing the other pollutants and stressors on the 303(d) list at this time, we will reconsider them as part of ongoing monitoring and assessment and the next review and update of the 303(d) list in 2000.

PROPOSED TMDL PRIORITIES

We are expected to rank each listed water body and cause as "High," "Medium" or "Low", and to schedule each water body and cause on the 303(d) list for a TMDL. (See attached 1998 Clean Water Act Section 303(d) Listing Guidance for California (August 1997)). Those ranked as "High" are expected to commence within the next two years; those ranked "Medium" are expected to commence within the next five years; and those ranked "Low" are expected to commence after five years but be completed within thirteen years.

The following factors were considered in priority ranking of each listed water body and cause for TMDLs:

- water body significance (such as importance and extent of beneficial uses, threatened and endangered species concerns and size of water body);
- degree of impairment or threat (such as number of pollutants or stressors of concern, and number of beneficial uses impaired or threatened);
- conformity with related activities in the watershed (such as existence of watershed assessment, planning, pollution control and remediation, or restoration efforts in the area);
- potential for beneficial use protection or recovery;
- degree of public concern; and
- available information.

The priority ranking, in particular, is based on our existing watershed management planning efforts in the San Clara Basin and the Napa River watersheds.

Schedules for TMDL development after the first two years should be regarded as very tentative. Completion will depend significantly upon the availability of funding, availability of staff, watershed stakeholder group priorities, and further evaluation of the need for and feasibility of TMDLs. If additional water bodies and/or causes are listed in subsequent 303(d) review cycles, TMDL schedules may also need to be revised.

PROPOSED 1998 LIST OF 303(d) WATER BODIES

Bay Delta System

1. South San Francisco Bay
2. Lower San Francisco Bay
3. Central SF Bay
4. Richardson Bay
5. San Pablo Bay
6. Carquinez Strait
7. Suisun Bay
8. Delta

Santa Clara County

9. Calero Reservoir
10. Guadalupe Reservoir
11. Alamos Creek
12. Guadalupe Creek

13. Guadalupe River

Napa County

14. Napa River

Sonoma County

15. Petaluma River
16. Sonoma Creek

Marin County

17. Tomales Bay
18. Lagunitas Creek

19. Walker Creek

Solano County

20. Suisun Marsh Wetlands
21. Herman Lake

PROPOSED CHANGES TO THE 303(d) LIST

The attached 1998 - 303(d) and TMDL Priority List for the San Francisco Bay Region, Table A1- Bay Segments and Table A2 - Other Bay Area Water Bodies provide a summary of listed water bodies, causes of impairment, sources of the cause, priority for development of TMDL, size affected, and proposed start and end date for TMDL development.

Significant changes to the 303(d) list are noted below.

1. One water body, the Delta, has been added to the list. The Delta is contiguous with Suisun Bay, and its omission on the 1996-303(d) list was an oversight.
2. The Richardson Bay listing for *pathogens* has been modified to reflect the actual affected area is Waldo Point Harbor. Furthermore, the source has been positively identified as substandard sewage systems in some houseboat areas, and an extensive local control program in place has produced significant water quality improvements. If these improvements continue, we will consider delisting the Waldo Point Harbor area of Richardson Bay at a further update.
3. *Pesticides* have been added as a cause of impairment to all Bay segments. The pesticide diazinon has been measured at levels which cause water column toxicity. The pesticide chlorpyrifos may also be a problem. This listing is consistent with listing of the Delta for these pesticides by the Central Valley Regional Water Quality Control Board. Efforts are underway to develop control strategies for both urban runoff and agricultural sources.
4. The listing of the Bay segments for *metals* has been refined to reflect the actual metals of concern. These are *mercury*, *copper*, and *nickel* in the South and Lower San Francisco Bay segments; *mercury*, *copper*, and *selenium* in the Central Bay, San Pablo Bay, Carquinez Straits, Suisun Bay, and Delta segments; and *mercury* in Richardson Bay.

Attachments:

1. 1998 -303(d) and TMDL Priority List for the San Francisco Bay Region:
Table A-1, Bay Segments
Table A-2, Other Bay Area Water Bodies
2. 1996 303(d) Priority List For Region 2
3. 1998 Clean Water Act Section 303(d) Listing Guidance for California (August 1997)

1998 303(d) AND TMDL PRIORITY LIST FOR SAN FRANCISCO BAY REGION

Table A1 - Bay Segments

NAME	CAUSES	SOURCES	PRIORITY	SIZE AFFECTED	UNIT	TMDL DATE START END	COMMENTS
SOUTH SAN FRANCISCO BAY	Mercury	Resource Extraction	High	24,500	Acres	1998 2003	Current data indicate fish consumption and wildlife consumption impacted uses; health consumption advisory in effect for multiple fish species including striped bass and shark; major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources; water objective exceedances, elevated sediment levels, elevated tissue levels; water quality impaired, yes on 303(d) list, TMDL is high priority
		Nonpoint Source					
		Municipal Point Sources					
		Industrial Point Sources					
		Atmospheric Deposition					
		Natural Sources					
	Copper	Municipal Point Sources	High	24,500	Acres	1998 2003	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
		Urban Runoff/Storm Sewers					
		Atmospheric Deposition					
		Other					
	Nickel	Municipal Point Sources	High	24,500	Acres	1998 2003	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
		Urban Runoff/Storm Sewers					
		Other					
	Pesticides	Agriculture	Medium	25,000	Acres	2000 2005	Diazinon and chlorpyrifos levels cause water column toxicity. Two patterns: pulses through riverine systems linked to agricultural application in late winter and pulse from residential land use areas linked to homeowner pesticide use in late spring, early summer.
		Urban Runoff/Storm Sewers					
LOWER SAN FRANCISCO BAY	Mercury	Resource Extraction	High	79,900	Acres	1998 2003	Current data indicate fish consumption and wildlife consumption impacted uses; health consumption advisory in effect for multiple fish species including striped bass and shark; major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources; water objective exceedances, elevated sediment levels, elevated tissue levels
		Nonpoint source					
		Municipal point sources					
		Industrial Point Sources					
		Atmospheric Deposition					
		Natural Sources					
	Copper	Municipal point sources	Medium	79,900	Acres	2003 2008	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
		Urban Runoff/Storm Sewers					
		Atmospheric Deposition					
		Other					
	Nickel	Municipal point sources	Medium	79,900	Acres	2003 2008	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
		Urban Runoff/Storm Sewers					
		Atmospheric Deposition					
		Other					
	Pesticides	Agriculture	Medium	25,000	Acres	2000 2005	Diazinon and chlorpyrifos levels cause water column toxicity. Two patterns: pulses through riverine systems linked to agricultural application in late winter and pulse from residential land use areas linked to homeowner pesticide use in late spring, early summer.
		Urban Runoff/Storm Sewers					

Table A1 - Bay Segments

NAME	CAUSES	SOURCES	PRIORITY	SIZE		TMDL DATE		COMMENTS
				AFFECTED	UNIT	START	END	
CENTRAL SAN FRANCISCO BAY	Selenium	Industrial Point Sources Agriculture Exotic Species Natural Sources	Low	67,700	Acres	2006	2010	Affected use is one branch of the food chain; most sensitive indicator is hatchability in nesting diving birds; significant contributions from oil refineries (control program in place) and agriculture (carried downstream by rivers); exotic species may have made food chain more susceptible to accumulation of selenium; health consumption advisory in effect for scaup and scoter (diving ducks); low TMDL priority because Individual Control Strategy in place.
	Mercury	Resource Extraction Nonpoint Source Municipal Point Sources Industrial Point Sources Atmospheric Deposition Natural Sources	High	67,700	Acres	1998	2003	Current data indicate fish consumption and wildlife consumption impacted uses; health consumption advisory in effect for multiple fish species including striped bass and shark; major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources
	Copper	Municipal Point Sources Urban Runoff/Storm Sewers Atmospheric Deposition Other	Medium	25,000	Acres	2003	2008	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
	Pesticides	Agriculture Urban Runoff/Storm Sewers	Medium	25,000	Acres	2000	2005	Diazinon and chlorpyrifos levels cause water column toxicity. Two patterns: pulses through riverine systems linked to agricultural application in late winter and pulse from residential land use areas linked to homeowner pesticide use in late spring, early summer.
RICHARDSON BAY	Coliform	Septage Disposal Urban Runoff/Storm Sewers Boat Discharge/Vessel Wastes	Medium	200	Acres	2003	2008	Affected area, Waldo Point Harbor, is less than 10% of embayment; source has been positively identified as substandard sewage systems in some houseboat areas; extensive local control program in place with significant water quality improvements
	Mercury	Resource Extraction Nonpoint source Municipal point sources Industrial point sources Atmospheric Deposition Natural Sources	High	2,560	Acres	1998	2003	Current data indicate fish consumption and wildlife consumption impacted uses; health consumption advisory in effect for multiple fish species including striped bass and shark; major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources

1998 303(d) AND TMDL PRIORITY LIST FOR SAN FRANCISCO BAY REGION

Table A1 - Bay Segments

NAME	CAUSES	SOURCES	PRIORITY	SIZE AFFECTED	UNIT	TMDL DATE START END	COMMENTS
SAN PABLO BAY	Selenium	Industrial Point Sources Agriculture Exotic Species Natural Sources	Low	71,300	Acres	2006 2010	Affected use is one branch of the food chain; most sensitive indicator is hatchability in nesting diving birds; significant contributions from oil refineries (control program in place) and agriculture (carried downstream by rivers); exotic species may have made food chain more susceptible to accumulation of selenium; health consumption advisory in effect for scaup and scoter (diving ducks); water quality impaired, yes on 303(d) list, low TMDL priority because Individual Control Strategy in place
	Mercury	Resource Extraction Nonpoint Source Municipal Point Sources Industrial Point Sources Atmospheric Deposition Natural Sources	High	71,300	Acres	1998 2003	Current data indicate fish consumption and wildlife consumption impacted uses; health consumption advisory in effect for multiple fish species including striped bass and shark; major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources
	Copper	Municipal Point Sources Urban Runoff/Storm Sewers Atmospheric Deposition Other	Medium	25,000	Acres	2003 2008	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
	Pesticides	Agriculture Urban Runoff/Storm Sewers	Medium	25,000	Acres	2000 2005	Diazinon and chlorpyrifos levels cause water column toxicity. Two patterns: pulses through riverine systems linked to agricultural application in late winter and pulse from residential land use areas linked to homeowner pesticide use in late spring, early summer.
CARQUINEZ STRAIT	Selenium	Industrial Point Sources Agriculture Exotic Species Natural Sources	Low	6,560	Acres	2006 2010	Affected use is one branch of the food chain; most sensitive indicator is hatchability in nesting diving birds; significant contributions from oil refineries (control program in place) and agriculture (carried downstream by rivers); exotic species may have made food chain more susceptible to accumulation of selenium; health consumption advisory in effect for scaup and scoter (diving ducks); water quality impaired, low TMDL priority because local Individual Control Strategies program in place
	Mercury	Resource Extraction Nonpoint Source Municipal Point Sources Industrial Point Sources Atmospheric Deposition Natural Sources	High	6,560	Acres	1998 2003	Current data indicate fish consumption and wildlife consumption impacted uses; major source is historic: gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources
	Copper	Municipal Point Sources Urban Runoff/Storm Sewers Atmospheric Deposition Other	Medium	25,000	Acres	2003 2008	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
	Pesticides	Agriculture Urban Runoff/Storm Sewers	Medium	25,000	Acres	2000 2005	Diazinon and chlorpyrifos levels cause water column toxicity. Two patterns: pulses through riverine systems linked to agricultural application in late winter and pulse from residential land use areas linked to homeowner pesticide use in late spring, early summer.

Table A1 - Bay Segments

NAME	CAUSES	SOURCES	PRIORITY	SIZE		TMDL DATE		COMMENTS
				AFFECTED	UNIT	START	END	
SUISUN BAY	Selenium	Industrial Point Sources Agriculture Exotic Species Natural Sources	Low	25,000	Acres	2006	2010	Affected use is one branch of the food chain; most sensitive indicator is hatchability in nesting diving birds; significant contributions from oil refineries (control program in place) and agriculture (carried downstream by rivers); exotic species may have made food chain more susceptible to accumulation of selenium; health consumption advisory in effect for scaup and scoter (diving ducks); low TMDL priority because Individual Control Strategies in place.
	Mercury	Resource Extraction Nonpoint Source Municipal Point Sources Industrial Point Sources Atmospheric Deposition Natural Sources	High	25,000	Acres	1998	2003	Current data indicates fish consumption and wildlife consumption impacted uses; major source is historic gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources.
	Copper	Municipal Point Sources Urban Runoff/Storm Sewers Atmospheric Deposition Other	Medium	25,000	Acres	2003	2008	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
	Pesticides	Agriculture Urban Runoff/Storm Sewers	Medium	25,000	Acres	2000	2005	Diazinon and chlorpyrifos levels cause water column toxicity. Two patterns: pulses through riverine systems linked to agricultural application in late winter and pulse from residential land use areas linked to homeowner pesticide use in late spring, early summer.
DELTA	Selenium	Industrial Point Sources Agriculture Exotic Species Natural Sources	Low	15,000	Acres	2006	2010	Affected use is one branch of the food chain; most sensitive indicator is hatchability in nesting diving birds; significant contributions from oil refineries (control program in place) and agriculture (carried downstream by rivers); exotic species may have made food chain more susceptible to accumulation of selenium; health consumption advisory in effect for scaup and scoter (diving ducks); low TMDL priority because Individual Control Strategies in place.
	Mercury	Resource Extraction Nonpoint Source Municipal Point Sources Industrial Point Sources Atmospheric Deposition	High	15,000	Acres	1998	2003	Current data indicate fish consumption and wildlife consumption impacted uses; major source is historic gold mining sediments and local mercury mining; most significant ongoing source is erosion and drainage from abandoned mines; moderate to low level inputs from point sources.
	Copper	Municipal Point Sources Urban Runoff/Storm Sewers Atmospheric Deposition Other	Medium	15,000	Acres	2003	2008	Exceedance of California Toxic Rules dissolved criteria and National Toxic Rules total criteria; elevated water & sediment tissue levels.
	Pesticides	Agriculture Urban Runoff/Storm Sewers	Medium	15,000	Acres	2000	2005	Diazinon and chlorpyrifos levels cause water column toxicity. Two patterns: pulses through riverine systems linked to agricultural application in late winter and pulse from residential land use areas linked to homeowner pesticide use in late spring, early summer.

1998 303(d) AND TMDL PRIORITY LIST FOR SAN FRANCISCO BAY REGION

Table A2 - Other Bay Area Water Bodies

NAME	CAUSES	SOURCES	PRIORITY	SIZE AFFECTED	UNIT	TMDL START	DATE END	COMMENTS
CALERO RESERVOIR	Mercury	Mine Tailings Surface Mining	High	360	Acres	1998	2003	TMDL will be developed as part of the Santa Clara Basin Watershed Management Initiative. Additional monitoring and assessment is needed.
GUADALUPE RESERVOIR	Mercury	Mine Tailings Surface Mining	High	80	Acres	1998	2003	TMDL will be developed as part of the Santa Clara Basin Watershed Management Initiative. Additional monitoring and assessment is needed.
ALAMITOS CREEK	Mercury	Mine Tailings	High	21	Miles	1998	2003	TMDL will be developed as part of the Santa Clara Basin Watershed Management Initiative. Additional monitoring and assessment is needed.
GUADALUPE CREEK	Mercury	Mine Tailings	High	6	Miles	1998	2003	TMDL will be developed as part of the Santa Clara Basin Watershed Management Initiative. Additional monitoring and assessment is needed.
GUADALUPE RIVER	Mercury	Mine Tailings	High	30	Miles	1998	2003	TMDL will be developed as part of the Santa Clara Basin Watershed Management Initiative. Additional monitoring and assessment is needed.
NAPA RIVER	Nutrients	Agriculture	High	55	Miles	1998	2003	TMDL's will be developed as part of ongoing watershed management effort. Additional monitoring and assessment needed.
	Pathogens	Agriculture Urban Runoff/Storm Sewers	High	55	Miles	1998	2003	
	Siltation	Agriculture Construction/Land Development Urban Runoff/Storm Sewers	High	55	Miles	1998	2003	
PETALUMA RIVER	Nutrients	Agriculture Construction/Land Development Urban Runoff/Storm Sewers	Medium	25	Miles	2000	2005	TMDL's will be developed as part of ongoing watershed management effort. Additional monitoring and assessment needed.
	Pathogens	Agriculture Construction/Land Development Urban Runoff/Storm Sewers	Medium	25	Miles	2000	2005	
	Siltation	Agriculture Construction/Land Development Urban Runoff/Storm Sewers	Medium	25	Miles	2000	2005	

1998 303(d) AND TMDL PRIORITY LIST FOR SAN FRANCISCO BAY REGION

Table A2 - Other Bay Area Water Bodies

NAME	CAUSES	SOURCES	PRIORITY	SIZE AFFECTED	UNIT	TMDL START	DATE END	COMMENTS
SONOMA CREEK	Nutrients	Agriculture Construction/Land Development Urban Runoff/Storm Sewers	Medium	23	Miles	2000	2005	TMDL's will be developed as part of ongoing watershed management effort. Additional monitoring and assessment needed.
	Pathogens	Agriculture Construction/Land Development Urban Runoff/Storm Sewers	Medium	23	Miles	2000	2005	
	Siltation	Agriculture Construction/Land Development Urban Runoff/Storm Sewers	Medium	23	Miles	2000	2005	
TOMALES BAY	Metals	Mine Tailings	Medium	7,820	Acres	2002	2007	TMDL's will be developed as part of evolving watershed management effort. Tributary streams, Lagunitas Creek and Walker Creek, must be managed first. Additional monitoring and assessment needed.
	Nutrients	Agriculture	Medium	7,820	Acres	2002	2007	
	Pathogens	Animal Operation Septage Disposal	Medium	7,820	Acres	2002	2007	
	Siltation	Agriculture Upstream Impoundment	Medium	7,820	Acres	2002	2007	
LAGUNITAS CREEK	Nutrients	Agriculture Urban Runoff/Storm Sewers	Medium	22	Miles	2002	2007	Tributary to Tomales Bay. TMDL's will be developed as part of evolving watershed management effort. Additional monitoring and assessment needed.
	Pathogens	Agriculture Urban Runoff/Storm Sewers	Medium	22	Miles	2002	2007	
	Siltation	Agriculture Urban Runoff/Storm Sewers	Medium	22	Miles	2002	2007	
WALKER CREEK	Metals	Mine Tailings Surface Mining	Medium	25	Miles	2002	2007	Tributary to Tomales Bay. TMDL's will be developed as part of evolving watershed management effort. Additional monitoring and assessment needed.
	Nutrients	Agriculture	Medium	25	Miles	2002	2007	
	Siltation	Agriculture	Medium	25	Miles	2002	2007	
SUISUN MARSH WETLANDS	Metals	Agriculture Flow Regulation/Modification Urban Runoff/Storm Sewers	Medium	57,000	Acres	2003	2008	Additional monitoring and assessment needed.
	Nutrients	Agriculture Flow Regulation/Modification Urban Runoff/Storm Sewers	Medium	57,000	Acres	2003	2008	
	Organic Enrichment	Agriculture	Medium	57,000	Acres	2003	2008	
	Low D.O.	Flow Regulation/Modification Urban Runoff/Storm Sewers						
	Salinity	Agriculture Flow Regulation/Modification Urban Runoff/Storm Sewers	Medium	57,000	Acres	2003	2008	
MERMAN LAKE	Mercury	Surface Mining	Low	110	Acres	2005	2010	Additional monitoring and assessment needed. Problem due to historical mining

1996 - REGION 2

WATER QUALITY-IMPAIRED WATERBODY (303(d)) LIST

WATERBODY NAME	POLLUTANTS/IMPAIRMENTS	SOURCES OF POLLUTANTS/IMPAIRMENTS	PRIORITY
<i>Bay/Delta System</i>			
Suisun Bay	metals	municipal and industrial point sources, surface mining, urban runoff/ storm sewers	medium
Carquinez Strait	metals	municipal and industrial point sources, surface mining, urban runoff/ storm sewers	medium
San Pablo Bay	metals	municipal and industrial point sources, surface mining, urban runoff/ storm sewers	medium
Central SF Bay	metals	municipal and industrial point sources, surface mining, urban runoff/ storm sewers	medium
Richardson Bay	pathogens	urban runoff/ storm sewers, marinas	medium
Lower SF Bay	metals	municipal point sources, urban runoff/ storm sewers	medium
South SF Bay	metals	municipal point sources, urban runoff/ storm sewers, surface mining	high
<i>Marin County</i>			
Tomaes Bay	metals, nutrients, siltation, pathogens	mine tailings, agriculture, upstream impoundments, septic tanks	medium
Walker Creek	metals, nutrients, siltation	mine tailings, agriculture	medium
Lagunitas Creek	pathogens, nutrients, siltation	agriculture, urban runoff/storm sewers	medium
<i>Sonoma County</i>			
Petaluma River	nutrients, pathogens, siltation	agriculture, construction, urban runoff/storm sewers	medium
Sonoma Creek	nutrients, pathogens, siltation	agriculture, construction, urban runoff/storm sewers	medium

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ATTACHMENT 2

WATER QUALITY-IMPAIRED WATERBODY (303(d)) LIST - Page 2

WATERBODY NAME	POLLUTANTS/IMPAIRMENTS	SOURCES OF POLLUTANTS/IMPAIRMENTS	PRIORITY
<i>Napa County</i>			
Napa River	nutrients, siltation, pathogens	agriculture, construction, urban runoff/storm sewers	high
<i>Solano County</i>			
Lake Herman	metals (mercury)	surface mining	low
Suisun Marsh	metals, nutrients, salinity, low DO	agriculture, construction, urban runoff/storm sewers, flow regulation/modification	medium
<i>Santa Clara County</i>			
Calero Reservoir	metals (mercury)	surface mining/mine tailings	high
Guadalupe Reservoir	metals (mercury)	surface mining/mine tailings	high
Alamitos Creek	metals (mercury)	surface mining/mine tailings	high
Guadalupe Creek	metals (mercury)	surface mining/mine tailings	high
Guadalupe River	metals (mercury)	surface mining/mine tailings	high

1) - Priority for Source Contribution Study/ TMDL process

1998 CLEAN WATER ACT (CWA) SECTION 303(d)
LISTING GUIDELINES FOR CALIFORNIA
(August 11, 1997)

A. Introduction

The Total Maximum Daily Load (TMDL) Workgroup¹ identified the need to develop statewide consistency on 303(d) listing issues. At its roundtable meeting on April 30, 1997, the workgroup decided to develop 303(d) listing guidelines that would be acceptable to the Regional Water Quality Control Boards (RWQCB), State Water Resources Control Board (SWRCB), and U.S. Environmental Protection Agency (U.S. EPA). Three work teams were formed to address various 303(d) listing issues. Each team met several times to develop a draft work team product. The work team products were circulated for comment from the TMDL workgroup and the drafts were revised by the work teams. The TMDL workgroup held a second roundtable meeting on July 28, 1997 to review the integrated product of the three work teams, and revisions to the listing guidelines were made (a list of attendees at the TMDL roundtable meetings and work team members is attached).

The guidelines address the following topics: listing/delisting factors, scheduling and prioritization, public notice procedures, the 303(d) list submittal package, and coordination with the Watershed Management Initiative (WMI).

B. Listing Factors

The following factors were developed to provide for consistent statewide decisions on listing California surface water bodies under CWA Section 303(d). However, they are meant to be flexible, and the RWQCBs should exercise judgment based on the specific circumstances for each water body. The listing factors will be reviewed periodically and may be revised to reflect new scientific information or newly developed water quality criteria (e.g., sediment criteria,

¹ An ad hoc workgroup of staff from the Regional Water Quality Control Boards, State Water Resources Control Board, and U.S. EPA that have an interest in 303(d) issues.

criteria for evaluation of wetland functions). Information sources which should be considered include sources listed in 40 CFR 130.7(b)(5) and sources found in Appendix D of the 1996 305(b) Guidance from U.S. EPA.

Water bodies may be listed if any one of these factors is met²:

1. Effluent limitations or other pollution control requirements [e.g., Best Management Practices (BMPs)] are not stringent enough to assure protection of beneficial uses and attainment of SWRCB and RWQCB objectives, including those implementing SWRCB Resolution Number 68-16 "Statement of Policy with Respect to Maintaining High Quality of Waters in California" [see also 40 CFR 130.7(b)(1)].
2. Fishing, drinking water, or swimming advisory currently in effect. This does not apply to advisories related to discharge in violation of existing WDR's or NPDES permit.
3. Beneficial uses are impaired or are expected to be impaired within the listing cycle (i.e. in next two years). Impairment is based upon evaluation of chemical, physical, or biological integrity. Impairment will be determined by "qualitative assessment"³, physical/chemical monitoring, bioassay tests, and/or other biological monitoring. Applicable Federal criteria and RWQCB Water Quality Control Plans determine the basis for impairment status.

² U. S. EPA's national policy is that water bodies impaired by natural conditions should be listed. In light of this policy, the RWQCBs should consider designating such water bodies as a low priority for establishing TMDLs.

³ Qualitative Assessment: An assessment based upon information other than ambient monitoring data. Information used may include land use data, water quality impacts, predictive modeling using estimated input variables, or fish and game biologist surveys. A sole reliance on professional judgment, literature statements (often judgment based), or public comments should not be the only basis for listing.

4. The water body is on the previous 303(d) list and either:
 - (a) "monitored assessment"⁴ continues to demonstrate a violation of objective(s) or (b) "monitored assessment" has not been performed.
5. Data indicate tissue concentrations in consumable body parts of fish or shellfish exceed applicable tissue criteria or guidelines. Such criteria or guidelines may include SWRCB Maximum Tissue Residue Level values, FDA Action Levels, NAS Guidelines, and U.S. EPA tissue criteria for the protection of wildlife as they become available.
6. The water quality is of such concern that the RWQCB determines the water body needs to be afforded a level of protection offered by a 303(d) listing.

C. Delisting Factors

Water bodies may be delisted for specific pollutants or stressors if any one of these factors is met:

1. Objectives are revised (for example, Site Specific Objectives), and the exceedence is thereby eliminated.
2. A beneficial use is de-designated after U.S. EPA approval of a Use Attainability Analysis, and the non-support issue is thereby eliminated.
3. Faulty data led to the initial listing. Faulty data include, but are not limited to, typographical errors, improper quality assurance/quality control (QA/QC) procedures, or Toxic Substances Monitoring/State Mussel Watch EDLs which are not confirmed by risk assessment for human consumption.
4. It has been documented that the objectives are being met and beneficial uses are not impaired based upon "Monitored Assessment" criteria.

⁴ **Monitored Assessment:** For aquatic life uses, monitored assessment should be based upon a minimum of Level 2 information, as indicated in the 1996 305(b) guidance [Guidelines for Preparation of the 1996 State Water Quality Assessments ("305(b) Reports"), EPA 841 B-95-001, May 1995; Pages 5-6 through 5-10, Tables 5-2 & 5-3]. There is a need to develop guidance for Minimum Data Requirements for assessing other beneficial uses.

5. A TMDL has been approved by the U.S. EPA.
6. There are control measures in place which will result in protection of beneficial uses. Control measures include permits, clean up and abatement orders, and watershed management plans which are enforceable and include a time schedule.

D. Priority Ranking, Targeting, and Scheduling

Priority Ranking

A priority ranking should be provided for listed waters to guide TMDL planning pursuant to 40 CFR 130.7. RWQCBs should apply the following criteria in ranking TMDLs in high (H), medium (M), and low (L) priority categories:

- water body significance (such as importance and extent of beneficial uses, threatened and endangered species' concerns and size of water body)
- degree of impairment or threat (such as number of pollutants/stressors of concern, and number of beneficial uses impaired or threatened)
- conformity with related activities in the watershed (such as existence of watershed assessment, planning, pollution control, and remediation, or restoration efforts in the area)
- potential for beneficial use protection or recovery
- degree of public concern
- available information

All water bodies should be ranked in one of the three categories (H, M and L) . Not all high priority waters need to be targeted in the next two years for TMDLs.

Scheduling and Targeting

Schedules for starting, completing and submitting TMDLs should be provided for all listed waters/pollutants pursuant to 40 CFR 130.7(d)(1). The schedules should provide for submittal of all TMDLs for all listed waters/pollutants on the 1998 list. Given the difficulty of estimating TMDL development time frames, RWQCBs should make best estimates based on TMDL resource planning efforts being conducted pursuant to the WMI process. The schedules should be presented in three levels to reflect degree of certainty regarding the attainability of the schedules.

Level 1: Next Two Years: Some waters should be targeted for TMDL development over the next two years pursuant to 40 CFR 130.7. Waters should be targeted in cases where substantial work on TMDL development is expected during the next two years, even if the TMDL is not scheduled for completion until after the next two years. The schedules for targeted waters should be consistent with the RWQCB's WMI planning chapter. The rationale for targeting a particular set of waters should be documented.

Level 2: Five Year Time Frame: RWQCBs should provide schedules for TMDLs to be initiated over the next five years, resource needs for which should be reflected in the RWQCB's WMI planning chapter (see section G) and addressed in WMI resource allocation decision-making. Schedules should be based on those TMDL activities for which RWQCBs are actively seeking funding support and should include TMDLs for which funding is reasonably likely to become available through other state, federal, or third party (e.g., discharger) sources.

Level 3: Years 5-13: RWQCBs should provide tentative schedules for completing TMDLs for the remaining waters over a period not to exceed 13 years. Schedules should be based on those TMDL activities for which RWQCBs are planning to seek funding support, with appropriate caveats stating that these provisional schedules are dependent on resource availability and further evaluation of TMDL applicability and feasibility.

E. Public Notice Procedures

At a minimum, each RWQCB shall conduct the following public participation activities:

1. Provide a 30-day comment period with public notice of the proposed 303(d) list. The RWQCB should consider the following options to fulfill the public notice requirements:

Option A. RWQCB workshop and adoption of the draft 303(d) list at a public hearing

The RWQCB may conduct a workshop to consider the draft 303(d) list followed by a public hearing to adopt the 303(d) list. A 30-day public notice shall be provided for the workshop and 45-day public notice shall be provided for the public hearing. Written comments should be submitted 15 days prior to the public hearing.

Option B. RWQCB adoption of the draft 303(d) list at a regular Board meeting

The RWQCB may adopt the 303(d) list at a regular Board meeting. A 30-day public notice of the RWQCB's intent to consider adoption of the draft 303(d) list, TMDL priority ranking and scheduling should be provided. The public notice shall solicit written comments on the draft 303(d) list. Written comments should be submitted 7 days prior to the RWQCB meeting.

Option C. RWQCB adoption of the draft 303(d) list at a public hearing (no workshop)

The RWQCB may adopt the 303(d) list at a duly noticed public hearing (45-day public notice). The public notice shall solicit written comments on the draft 303(d) list. Written comments should be submitted 15 days prior to the RWQCB meeting.

2. Prepare a responsiveness summary (40 CFR part 25) responding to all written comments on the draft 303(d) list received by the cut-off date.

The RWQCB should consider the following:

Provide 90-day public notice of RWQCB's intent to consider revisions to 303(d) list, establish TMDL priority ranking and development schedule. This notice should outline the criteria used for listing decisions and which watersheds will be assessed in this listing cycle. The notice shall solicit information, data, and other relevant factors to assist RWQCB staff in the preparation of the draft 303(d) list and TMDL priority ranking/schedule.

F. 303(d) List Submittal Package

At a minimum, each RWQCB should submit to the SWRCB the following information with the 303(d) list submittal:

1. 303(d) list of water bodies (referenced on maps, if feasible), pollutant or stressors, pollutant sources, extent of impairment (e.g. miles of stream, acres of estuary), TMDL priority ranking and schedule for TMDL development for all listed water bodies by the RWQCB; and
2. list of water bodies and associated watersheds (referenced on maps, if feasible) which were assessed in the current cycle; and
3. factors used to list or delist specific waterbodies (see sections B and C). Criteria used to prioritize TMDL development (see section D.1.). Criteria used to generate TMDL development schedules (see section D.2.); and
4. documentation for TMDL priority ranking and scheduling decisions, which may include an estimate of resource needs for high priority water bodies for TMDL development; and
5. documentation of the public participation process
 - a. public notice(s)
 - b. responsiveness summary; and

6. list of RWQCB file(s) which contain the individual water body assessment data, information, etc. upon which the listing decision was made (note: a RWQCB may choose to submit the data assessment information in lieu of the minimum list of files to the SWRCB as part of the submittal package. This may be warranted for some water bodies where there is significant controversy).

G. Coordination with the Watershed Management Initiative (WMI)

RWQCBs should conduct the 303(d) assessment consistent with each region's schedule outlined in the WMI chapter for updating the Water Quality Assessment (WQA). The WQA includes the 303(d) listing. The TMDL priority ranking and scheduling shall also be consistent with the WMI chapter. In order to assure this consistency, each RWQCB should:

1. include the 303(d) listing/review schedule for each watershed in the regions' WMI chapter; and
2. include the TMDL priority ranking and scheduling in the regions' WMI chapter; and
3. include resource allocation projections for conducting the 303(d) listing assessment in the regions' WMI chapter.
4. in cases where the RWQCB focused the 303(d) listing/review on a subset of watersheds in the region, public comments on water bodies outside of targeted watersheds will be directed to the WMI process for prioritization.

APPENDIX C

D-035538

February 9, 1998

RESPONSE TO COMMENTS ON 1998 303(d) AND TMDL PRIORITY LIST
(Reference to specific commentors are noted in parentheses.)

General Comments

Several comments pertain to listing procedures, the listing process, and the extent of our review of available data. We focused our review on the Bay segments, given our resource and time constraints. We recognize that there are data available on many urban creeks and other water bodies. However, rather than accept these data with limited time to review and assess them, it will be more prudent to review and assess the suggested data and data sources over the next two years which will allow for a much more comprehensive review for the next update. (Marin Audubon, BayKeeper, CBE, Friends of Corte Madera, Benicia).

Other comments pertain to whether a water body and/or pollutant stressor should be listed when there may be uncertainties associated with the basis for listing (e.g., data quality, exceedance of narrative standards). In some cases it is more appropriate to list the pollutant and rank it low for development of a TMDL until the uncertainties are resolved, versus the alternative of not listing a pollutant until uncertainties are resolved. We also expect further monitoring and assessment of a listed water body will resolve uncertainties and may lead to consideration of delisting in some cases. (NRDC, BayKeeper, CBE, BADA)

There were a number of comments on the priority ranking recommended for TMDL development. We share many commentors concerns about the importance of many of the identified problems. However, we are constrained by limited resources at this time. High priority listing are limited to those pollutant stressors that we have already commenced working on or otherwise expect to start working on using known resources within the next two years. Priorities and schedules will be reviewed and revised with each listing update (e.g., in two years, certain medium priority listings will become high priority listings).

Comments on Bay Segments

Determination of Compliance With Standards

Technical and procedural issues have been raised concerning compliance with standards and listing of a water body as impaired due to a particular pollutant stressor.

1. Clear Violations of Standards

The water bodies and pollutant stressors listed on the 303(d) list are those cases where current standards are clearly exceeded (BADA, NRDC). The current standards consist of

the narrative and numeric objectives in the Basin Plan, the State antidegradation policy, and the federal standards promulgated for the San Francisco Bay Region under the 1992 National Toxics Rule. These standards apply to all fresh, salt, and estuarine waters as specified in the 1995 Basin Plan amendments—except for the Lower South Bay (south of the Dumbarton Bridge) where the numeric Basin Plan objectives do not apply (NRDC).

The Regional Board has reviewed national criteria, and, where appropriate adopted numeric objectives based on these criteria (subsequently vacated by the court decision to overturn the statewide plans). The Board has also consistently identified those constituents for which site-specific objectives might be appropriate in a series of Triennial Reviews since 1985 and undertook the complete process of developing site-specific objectives and TMDLs) for two high priority constituents—copper and nickel—in all embayments. Those site-specific objectives and TMDLs were subsequently remanded by the State Board (also due to the court decision). Despite procedural difficulties associated with site-specific objectives, the Board staff continue to believe that site-specific objectives are both : necessary and appropriate for copper, nickel, mercury, selenium, and PCBs (in all embayments) and potentially other metals in the Lower South Bay. This assessment is based on a significant body of research, monitoring data, and analyses. However, until that process is completed for each constituent, the current standards apply.

The following constituents/indicators clearly exceed standards in one or more of the San Francisco Embayments:

Toxicity: the numeric and narrative toxicity objectives are exceeded on a regular basis in the Delta, Suisun Bay, Carquinez Strait, and San Pablo Bay, and South and Lower San Francisco Bay. The observed toxicity has been linked to two specific pesticides: diazinon and chlorpyrifos. Also, diazinon has been measured at levels which exceed concentrations recommended by the California Department of Fish and Game. (40 ng/l (parts per trillion) four-day average / 80 ng/l one-hour average)

Selenium: A formal health advisory has been issued by OEHHA for benthic-feeding ducks in Suisun, San Pablo, and South San Francisco Bays. This health advisory clearly establishes that REC-1 beneficial use is not fully supported, and, hence, standards are not fully met.

Mercury: Mercury concentrations in the main embayments and several local stream-Bay confluences exceed the current Basin Plan numeric objectives on a consistent basis. In addition, a formal health advisory based on mercury levels in fish tissue has been in effect for all embayments since the early 1970s.

Nickel: Nickel concentrations in the main embayments and several local stream-Bay confluences exceed the current Basin Plan numeric objectives on a regular basis. Existing data indicate that impairment associated with nickel is greatest in the Lower South Bay and that site-specific objectives for nickel are necessary and appropriate for all embayments.

Copper: There has been a significant amount of scientific and regulatory attention paid to copper concentrations and the development of appropriate objectives for the Bay. While formal numeric objectives are not currently in the Basin Plan, staff believe that compliance with the narrative standards is best judged by whether concentrations meet or exceed 4.9 ug/l total copper at this time (4.9 ug/l is the *technical* basis for the site-specific objective adopted by the Regional Board and remains valid). Staff anticipate that when US EPA promulgates the California Toxics Rule, that all embayments will be in compliance with copper standards except the Lower and South Bays.

PCBs (including dioxin-like PCBs): Regional Monitoring Program data, as well as ongoing studies of cleanup sites, Bay sediment, and fish contamination consistently indicate that levels of PCBs in the Estuary are above thresholds of concern. The extent and nature of the water quality problem is highly dependent on the manner in which these thresholds are derived. If thresholds are based on comparing total PCB concentrations to a single tissue or water column concentration, then monitoring data are frequently above the threshold. If, however, Aroclor mixtures are used as the basis for deriving the threshold value, measured PCB concentrations trigger the threshold less frequently. Finally, if thresholds are based on individual PCB congeners, then measured concentrations only exceed the threshold on occasion. However, there is an interim health advisory in effect for consumption of fish due to PCBs, and we are interpreting this interim advisory as a violation of the narrative standards protecting REC-1 beneficial uses. Consequently, it is appropriate to list PCBs on the 303(d) list at this time (CBE, BayKeeper).

We intend to develop a comprehensive, watershed-based control strategy for any ongoing (and potential) sources of PCBs (CBE, BayKeeper, NRDC). Staff have already begun the process of collecting information from a diverse array of sites researchers working with Regional Monitoring Program have begun to analyze PCB "fingerprints" of Bay samples to determine what fraction of measured PCBs are associated with historical discharges.

Exotic Species: Exotic species clearly pose a significant threat to the San Francisco Bay segments and their beneficial uses. Affected uses include: navigational uses by blocking navigation channels; recreational uses by reducing numbers of sport fish; and commercial uses by reducing the numbers of fish relied on by commercial fisherman. The source of exotic species is discharge of ballast water. This issue should be given a high priority.

Based on this process and information, staff agree with commentors that:

Nickel violations in San Pablo, and Suisun Bays, Carquinez Strait, and the Delta were inadvertently omitted from the 303(d) list and will be added (BADA). However, we will first develop a TMDL for South San Francisco Bay as a pilot

project. Subsequently, we will address nickel in the other embayments. Accordingly, staff are assigning a low priority to a TMDL for nickel in the North Bay segments.

Selenium levels are the basis for an existing health advisory in effect for the South Bay (in addition to the embayments already listed) and thus South San Francisco Bay should be added to the 303(d) list. Based on research the Board required in 1992, inputs of selenium to this water body appear to be linked to local geological features and domestic use of groundwater drawn from pockets of soil high in selenium. Accordingly, staff are assigning a low priority to a TMDL for selenium (CLEAN SB, CDFG).

The proposed listing of pesticides should be changed to diazinon in all San Francisco Bay embayments to reflect the specific constituent of concern. (CLEAN SB, ACCWP, SCVURPPP)

PCBs in fish in all San Francisco Bay embayments are cause for an interim health advisory, and as such should be included on the 303(d) list. (BayKeeper, CBE)

Exotic Species are causing impairment or pose a significant threat to uses to all San Francisco Bay embayments and should be included on the 303(d) list. (BayKeeper)

2. Potential Violation of Standards

While there are a limited number of numeric objectives that specifically apply to San Francisco Bay, Board staff anticipate that US EPA will promulgate standards for all constituents for which objectives do not currently exist in the Region in the near future. These standards will not supersede existing Basin Plan objectives and will be based on national criteria (i.e. they will not include a consideration of site-specific conditions). In anticipation of federal action, Board staff have used the proposed criteria as screening criteria to identify cases where there may be a potential violation of standards in the future.

There are a number of instances where tissue and water column data trigger the proposed federal standards. Further analysis is necessary to determine (a) if the federal standard is indeed appropriate for local conditions, (b) the extent to which appropriate standards are exceeded, and (c) whether there are any ongoing, controllable sources that are contributing to observed tissue and water column concentrations.

We have the following specific comments about our assessment of Dioxins, Chlordane, Dieldrin, DDT (and by-products), Heptachlor, and PAHs in San Francisco Bay embayments:

Dioxins: Over the past three years, the Board has issued detailed, additional monitoring requirements to dischargers and Board staff have conducted a thorough analysis of dioxins in the Region. A number of proposed policy options for addressing dioxins have been developed by staff and are the subject of a public hearing this February (2/98) before the Board. Based on that extensive data review, staff have determined that:

- Dioxin levels in San Francisco Bay Region are comparable to background levels found elsewhere in the country and around the world;
- The interim fish consumption health advisory indicates that the additional risks posed by dioxins are much, much smaller than those posed by mercury and PCBs; thus mercury and PCBs should be higher priority than dioxins; and
- Current levels and fingerprints of dioxins indicate that the primary sources to water are atmospheric deposition; and that 2,3,7,8-TCDD national criteria are not likely to be exceeded.

It is our current assessment that dioxin levels may not violate the anticipated 2,3,7,8-TCDD national standards when they are promulgated. Consequently, we believe it is inappropriate to list San Francisco Bay embayments as water-quality limited due to dioxins at this time (CBE, BayKeeper).

Chlordane, Dieldrin, DDT (and by-products), Heptachlor, and PAHs: As described in the Water Quality Assessment, tissue levels of these constituents frequently exceed the tissue concentration levels embedded in the proposed federal standards. As is the case with PCBs, it is unclear whether the implicit tissue concentrations are appropriate for assessing local conditions. It should also be noted that except for PAHs, observed concentrations of these constituents are probably associated with historical contamination and not ongoing discharges. PAHs, on the other hand, are probably associated with atmospheric deposition. Because of these concerns, we do not believe that there is enough evidence to support a determination of a clear violation of narrative objectives at this time.

APPENDIX D

LIST OF COMMENTORS

(As of February 9, 1998)

Natural Resources Defense Council (David Beckman) - Pre-Public Notice Letter

Marin Audubon (Barbara Salzman)

CLEAN South Bay (Trish Mulvey)

California Fish and Game (CF&G)(Brian Hunter, Region 3)

Natural Resources Defense Council (NRDC) (David Beckman)

Community for a Better Environment (CBE) (Greg Karras)

San Francisco BayKeeper (Michael Lozeau)

City of San Jose / City of Santa Clara / Santa Clara Water Pollution Control Plant (Carl Mosher)

Alameda Countywide Clean Water Program (ACCWP) (G. Robert Hale)

Bay Area Dischargers Association (BADA) (Larry Walker)

Bruce Abelli-Amen

Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) (Adam Olivieri)

Friends of Corte Madera Creek Watershed (Carol D'Alessio / Sandra Guldman)

City of Benicia (Victoria Shidell)



Natural Resources
Defense Council

November 25, 1997

6370 San Vicente Blvd., Suite
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213 934-6900
Fax 213 934-1210

Ms. Loretta Barsamian
Executive Officer
San Francisco Bay Regional Water Quality Control Board (Region 2)
2101 Webster Street-Suite 500
Oakland, CA 94612

Re: *Impaired and Threatened Water Bodies; Clean Water Act Section 303(d)
List; Clean Water Act Section 303(e); Clean Water Act Section 305(b)
List; Total Maximum Daily Loads (TMDLs)*

Dear Executive Officer:

Recently, the Los Angeles office of the Natural Resources Defense Council requested that your agency keep us informed, and add us to any mailing lists, regarding proposed actions with respect to Clean Water Act Sections 303(d), 303(e), or 305(b) elements, including Total Maximum Daily Loads ("TMDLs"), lists of impaired or threatened water bodies and related matters, such as consideration of schedules, and priority ranking of water bodies. See 33 U.S.C. Section 1313(d)-(e). As we noted in that correspondence, we wish to participate in any public review and comment opportunities that your agency may make available regarding these matters.

Because of the significance of the Section 303(d) and (e) program, and our belief that the Section 303(d) and (e) duties are not being met by your agency and the State generally, we wish now to offer comments about these matters for your consideration generally and with respect to any upcoming hearings or other formal reviews of Section 303(d)-(e) or 305(b) elements. We ask that these comments be incorporated in the administrative record of such formal consideration(s) by your governing board.

The Clean Water Act and its implementing regulations lay out a detailed scheme for adoption and implementation of TMDLs. No later than June, 1979, California was required, among other things, to (1) identify water bodies within its boundaries for which effluent limitations are not stringent enough to implement any water quality standard applicable to such waters (threatened or impaired water bodies), (2) to establish a priority ranking of these water bodies, and (3) to establish TMDLs for each of the segments in accordance with their priority ranking. 33 U.S.C. § 1313(d)(1)(A) & (C). In developing TMDLs, the Clean Water Act states that loads must be established at a level necessary to achieve "applicable water quality standards" taking into account both (a) "seasonal variations" and (b) a "margin of safety." 33 U.S.C. § 1313(d)(1)(C). In addition, EPA regulations specify that California must include allocations for both point and nonpoint sources of pollution in their TMDLs. 40 C.F.R. § 130.2(i). California must submit the waterbody lists and actual TMDLs to EPA and "the Administrator shall either approve or disapprove such identification and load not later than thirty days after the date of submission." 33 U.S.C. § 1313(d)(2); see also 40 C.F.R. § 130.7(d)(2).

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Fax 212 727-1773

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New York, New York 10011
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1350 New York Ave., N.W.
Washington, DC 20005
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71 Stevenson Street
San Francisco, CA 94105
415 777-0220
Fax 415 495-5996

A chief benefit of the Section 303(d) and Section 303(e) process is that it holistically assesses all sources of pollution in a basin or watershed and then provides for a mechanism for States to curb those sources of pollution so that all individual water bodies achieve water quality standards. As one federal court recently explained: "Without an understanding of the Total Maximum Daily Load, and the various sources which lower a body of water's quality, there is little chance that the pollution is most efficiently controlled." For these and other reasons, the Section 303(d) and Section 303(e) requirements are central to achieving the goals of the Clean Water Act.

In California, the State Water Resources Control Board appears to have requested that the nine Regional Water Quality Control Boards comply with these statutory requirements. We believe that your agency has not complied with this statutory framework, notwithstanding the fact that under the Clean Water Act, compliance was due by June 1979, some eighteen years ago. Specifically, we believe that your agency has:

1. Failed to prepare a comprehensive listing of impaired and threatened water bodies requiring TMDLs. We believe that your agency has only considered some "readily available" information sources in compiling its list of water bodies for which effluent limitations are not stringent enough to implement any water quality standard -- to the extent that it has considered any information at all. The Clean Water Act requires that all impaired or threatened water bodies be identified and evaluated (*see, e.g., 40 C.F.R. § 130.7*), but the vast majority of water resources, including Bays and Harbors, Coastal Shoreline, Estuaries, Ground Water, Lakes and Reservoirs, Ocean and Open Bays, Rivers and Streams, Saline Lakes, and Freshwater and Tidal Wetlands remain unassessed. *See, e.g., California 305(b) Report on Water Quality* (State Water Resources Control Board, 1996). We also believe that your agency's list of impaired water bodies has changed arbitrarily from year to year.
2. Failed to prepare a comprehensive prioritized ranking of impaired and threatened water bodies requiring TMDLs. The ranking of water bodies fails to take into account the statutory requirements of severity of pollution and uses to be made of waters. *See 33 U.S.C. § 1313(d)(1)(A)*. We believe that your agency has not adequately considered priority ranking issues so as to address the most significantly impaired water bodies first. We also believe that the priority ranking system makes undue use of "medium" and "low" ranks as would be "safe harbors" that justify inaction. Finally in this regard, we believe that your agency has not developed TMDLs in accordance with its priority ranking of water bodies.
3. Failed to "clearly describe" the process for implementing the Section 303(d) scheme in its Continuing Planning Process Document and otherwise assure compliance with Section 303(e). 33 U.S.C. § 1313(e)(3)(C); 40 C.F.R. § 130.7. Section 303(d) and (e) implementing regulations mandate that each aspect of the Section 303(d) and (e)

process be "clearly described" in continuing planning documents, but we can find no such clear description or an otherwise adequate process in documents maintained by your agency.

4. Failed to provide a complete schedule providing for TMDL preparation by a date certain for all water bodies, as required by the Clean Water Act and implementing regulation, 40 C.F.R. Section 130(d).

5. Failed to develop TMDLs, submit TMDLs for approval, or incorporate TMDLs into Basin Plans or other documents. We do not believe that your agency has developed any TMDLs, including TMDLs for the water bodies it designated "high" priority in its 1996 Section 303(d) submission. *California 305(b) Report on Water Quality* (1996). Moreover, progress, if any, toward submittal of TMDLs can be characterized as beyond "glacial." You agency had a duty to establish TMDLs for water bodies requiring them by June 1979. We also believe that any schedules set are largely if not entirely "paper exercises." This is perhaps partly a function of the failure to request, arrange for, and budget sufficient resources to fund implementation of these core Clean Water Act duties, as required by law.

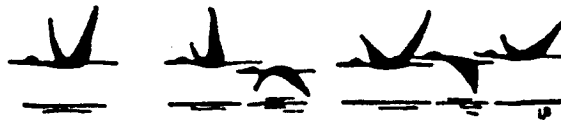
6. Failed to submit lists required by 40 C.F.R. Section 130.7 that comply with the requirements of 40 C.F.R. Section 130.7(b).

In these and other respects, we believe that your agency has not met the required standards with respect to Section 303(d) and 303(e) of the Clean Water Act. We respectfully request and urge that you, as the chief executive of your agency, immediately rectify these issues, each of which should have been completed and in place no later than June 1979. Please contact us if you have questions or wish to discuss our comments. Thank you for considering our views.

Very truly yours,



David S. Beckman, Esq.



Marin Audubon Society Box 599 Mill Valley, California 94942-0599

February 2, 1998

CALIFORNIA REGIONAL WATER

FEB - 5 1998

QUALITY CONTROL BOARD

Regional Water Quality Control Board
2101 Webster Street, Rm. 500
Oakland, CA 94612

RE: 303(d) Water Quality Assessment of Impaired Water Bodies

ATT: TOM MUMLEY

Dear Board Members:

The Marin Audubon Society wishes to request that Corte Madera Creek be added to the list of water bodies to be assessed as part of this year's evaluation. We also recommend that all of the other creeks in Marin County be systematically evaluated to determine the need to include them in this program.

While we would like to see all of the Creeks in Marin County assessed under this program, only three water bodies are on the proposed list. It is unclear why these were chosen over others. We believe that Corte Madera Creek meets the criteria for inclusion in this program.

Corte Madera Creek is the largest Creek in Marin County. This water body has been impacted by urban development and uses, yet it retains a remnant steelhead population and several remaining tidal marshes support endangered clapper rails. Other beneficial uses include recreation and migratory bird habitat. An active watershed group focusing on its problems has developed over the last 4 years and will be beginning a watershed planning effort shortly.

Thank you for considering our recommendation.

Sincerely,


Barbara Salzman, Chair
Conservation Committee

A Chapter of National Audubon Society



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D-035550

January 31, 1998

Tom Mumley, Ph.D.
San Francisco Bay
Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, CA 94612

RE: 1998 Water Quality Assessment and 303(d) list

Dear Dr. Mumley:

Please extend the listing of selenium as a cause of impairment to Lower Bay and South Bay with a medium to high priority for initiating source control activities.

Concerns and references include the stringent level of the public health consumption advisory for diving ducks (scaup and scoter), the apparent correlation of selenium with redd coat disease and abnormally shortened vibrissae in harbor seals observed at Mowry Slough, data from the Regional Monitoring Program for Trace Substances (San Francisco Estuary Institute), and the Metals Control Measures Plan priorities (Santa Clara Valley Urban Runoff Pollution Prevention Program).

Research by Greg Cutter (Old Dominion University) suggests that the San Jose/Santa Clara Water Pollution Control Plant is a significant conveyance for selenium to South Bay. The report "Copper and Selenium in the Water Supply of the Santa Clara Valley" indicates that the potable water supply (mostly from ground water sources) contributes fifty percent of the influent load (p.79) - with five wells contributing a disproportionate amount (App.C). Source control efforts should consider redirecting those wells to nonpotable irrigation uses except in times of drought emergencies.

For the record, I do support the listing of "pesticides" for all Bay and Delta segments. I also agree with the discussion at the Santa Clara Basin Watershed Management Initiative Bay Monitoring and Modeling meeting that listing of specific pesticides should be considered.

Thanks for your consideration of these comments. Please call if you have questions (650-326-0252).

Sincerely



Trish Mulvey
Co-Founder, CLEAN South Bay
527 Rhodes Drive, Palo Alto, CA 94303

attachments

Memorandum

To : Mr. Thomas Mumley
Senior Water Resources Control Engineer
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster St., Suite 500
Oakland, CA 94612

From : Department of Fish and Game

Date: February 2, 1998

CALIFORNIA REGIONAL WATER

FEB - 3 1998

QUALITY CONTROL BOARD

Subject: Proposed Revisions to Section 303(d) List and Priorities for Development of Total Maximum Daily Loads (TMDLs) for the San Francisco Bay Region

Department biologists have reviewed your staff report and proposed revisions to the Section 303(d) list and priorities for development of TMDLs for the Board's jurisdictional area. In general, we are very supportive of your proposed revisions and priorities as reasonable to resolve many current threats to fish and wildlife. However, we suggest, due to the recent federal listing of steelhead as a threatened species under the Endangered Species Act, and the apparent prolonged time line for initiation of monitoring or other data gathering activities, that waters which are used by this species for migration and spawning be elevated to a high priority.

Conditions which are especially deleterious to salmonid fishes include: siltation, discharge of toxic materials such as detergents, or disinfectants, toxic nutrients such as ammonia, increases in BOD and temperature. Non-point source pollutants from confined animal operations, as well as urban runoff can contribute to unacceptable stress, or even mortality of this sensitive species.

Steelhead still exist in the Napa River, Sonoma Creek, and the Petaluma River drainage, tributary to San Pablo Bay; Walker and Lagunitas Creeks, tributary to Tomales Bay; and San Franciscito, Coyote and Guadalupe Creeks, tributary to South Bay. While we understand that your board may not prioritize the regulation of agricultural or urban pollutants on the same level as that of municipal and industrial pollutants, we are nonetheless convinced that the TMDL process can result in improved protection for fish and wildlife.

We strongly encourage your board to consider elevating the priority listing for those waters listed above, and undertake the additional monitoring and assessment programs suggested in the staff report.

If you have any questions, please call Michael Rugg, Water Quality Biologist at (707) 944-5523.



Brian Hunter
Regional Manager
Region 3

cc: Don Lollock, OSPR

Conserving California's Wildlife Since 1870

San Francisco

BayKeeper™

February 2, 1998

Via facsimile and U.S. Mail

Mr. Thomas Mumley
Senior Water Resources Control Engineer
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, CA 94612

Re: Comments on Section 303(d) List Update

Dear Mr. Mumley:

Thank you for this opportunity to comment on the 303(d) list update. These comments are made on behalf of San Francisco BayKeeper and DeltaKeeper (hereinafter "BayKeeper"). Attached to this letter is a table of impaired water bodies and causes of impairment (Table 1) to be considered for addition to the list. We recognize that setting Total Maximum Daily Loads ("TMDLs"), including the necessary waste load allocations ("WLAs") and load allocations ("LAs"), for all of the water bodies listed in the table in the immediate future would be burdensome, but we believe that it is critical for the 303(d) list to be complete in order to accurately determine priorities for setting TMDLs.

The rationales provided in the staff report for not including certain known stressors are inappropriate and do not comport with Section 303(d) of the Clean Water Act. For example, those pollutants where staff has determined that identified water quality problems have been addressed by local regulatory programs are not included. The report offers up selenium as an example for this category. The example points out why this category needs to be included on the list. First of all, selenium has been proposed for inclusion on the list, despite the report's use of it as an example for not being included. Second, the report claims that selenium is being addressed by the refineries' individual control strategies. However, other sources of selenium exist as well and are not or may not be addressed by those ICSs. Indeed, the highest levels of selenium detected in the Bay are in the South Bay and no explanation is offered which claims that the refinery ICSs will resolve that problem in its entirety. Indeed, the South Bay and Lower South Bay are the only segments where selenium is not listed as a stressor (but, of course, should be). In short, there are a number of identified problems where a number of sources exist and where it is uncertain that current regulatory decisions will bring the problem under control. Staff should include on the 303(d) list all of the identified problems and analyze the merits of existing controls as part of the TMDL prioritization process, not as a hurdle to inclusion on the list of impaired waters.

Similarly, the staff report offers a rationale for avoiding identifying certain stressors where insufficient information exists to determine whether a TMDL process would afford better water quality protection than existing local requirements. This rationale appears designed to explain why none of the results shown in the Regional Board's own fish tissue study have made any impact to the proposed 303(d) list. The staff report elaborates by citing the high levels of PCBs known to be

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In Bay fish tissue studies, it is appropriate to include PCBs on the 303(d) list because the study concludes that the problem stems from historic rather than ongoing discharges. Again, the example argues in favor of including PCBs. Numerous existing sources of PCBs exist around the edge of the Bay, including for example storm water discharges from scrap yards handling old equipment and reservoir coatings (a number of years ago, the Regional Board fined EBMUD for discharging into an East Bay Creek PCB laden materials from work maintaining one of its reservoirs). Likewise, dioxin should be included on the 303(d) list because of the results of the fish tissue study and because there are in fact numerous identifiable sources that a TMDL would in fact help to bring under control. Indeed, this process may be the only way those sources are brought within the Act's purview.

In terms of priorities, BayKeeper urges the Regional Board, staff and EPA to take immediate steps to provide the resources and planning necessary to complete a full TMDL for the South San Francisco Bay, which will cover all of the pollutants of concern (not just copper and nickel as is now being pursued by the City of San Jose), as well as a full TMDL for the Napa River watershed. Although BayKeeper appreciates the efforts of the Watershed Management Initiatives for those two watersheds, a WMI does not replace the need for a technically-based, agency driven TMDL. We would concur in the choice of those priorities (although we suggest two other high priorities below).

BayKeeper supports staff's inclusion of pesticides as a source of acute and chronic toxicity to numerous areas of the Bay. BayKeeper and DeltaKeeper believe that the regulatory oversight of this source of contaminants to the Bay and Delta must be ratcheted up to include the full range of regulatory tools and move beyond the strictly voluntary programs that have failed to prevent the impairment of uses throughout the Bay and Delta.

One other broad concern with the proposed list is the scarce attention it pays to problems in the many creeks flowing into San Francisco Bay. Numerous reports detail the plight of the Bay's creeks and rivers, yet the proposed list focuses almost exclusively on the Bay itself, ignoring these critical tributaries. The recommended additions in the list below focus in large part on the plight of the Bay area's creeks.

We have relied on numerous compilations of data available for San Francisco Bay and its tributaries in order to compile Table 1. BayKeeper believes that each of the recommended waterbodies and pollutants are demonstrative of excessive pollutant levels and qualify for listing pursuant to factors 1, 2 and/or 3 of the listing guidelines in Attach. 3, p. 2 of the Staff Report entitled Proposed Revisions to Section 303(d) List and Priorities for Development of TMDLs for the San Francisco Bay Region. All reports are referenced in Table 1.

Other supporting documentation for listing waters in Table 1 stems from fish and harbor seal studies. Fish tissue samples from around the San Francisco Bay exceeded pilot screening values for many trace organics such as PCBs, Dioxin, DDT, Dieldrin and trace elements such as mercury. These screening values were based on an EPA guidance document entitled Guidance for Assessment of Chemical Contaminant Data For Use In Fish Advisories - Vol. I - Fish Sampling and Analysis (EPA 823-R-93-002) and were more conservative than the EPA values. (See Contaminant Levels in Fish Tissue from San Francisco Bay). PCBs and Dioxin are of particular concern because, contrary to the assertion of the staff report, sources of these two pollutants introducing them to the Bay and its tributaries do exist and will continue to exist short of a rigorous response by the regulatory agencies and the operators of the sources. For example, it is well

documented that dioxin is being emitted from Bay Area sources of various types (among other sources). A TMDL for dioxin is the way the Clean Water Act can help in getting a handle on this hazardous activity. BayKeeper recommends that a TMDL for dioxin and PCBs for San Francisco Bay be included in the High Priority Category.

In another study, Moss Landing Marine Laboratories found that blood samples taken from harbor seals around the San Francisco Bay contained trace elements and organics. Levels of many trace elements exceeded toxicity thresholds for humans. (See Toxic Pollutants, Health Indices, and Population Dynamics of Harbor Seals in San Francisco Bay, 1989-1992.) Such high levels of pollutants in fish and harbor seals are adequate evidence that beneficial uses, specifically wildlife uses, would be impaired during the listing cycle. The Moss Landing study underscores the need to prioritize PCBs on the TMDL list.

Chicken Creek should be added to the 303(d) list because of tritium discharged into the creek from Lawrence Berkeley Labs. Water column samples taken in 1993 registered levels of 18,100 picocuries per liter in this creek. We believe that this level may violate the narrative water quality objectives for radioactivity.

A report done for the U.S. Fish and Wildlife Service indicates that the San Francisco Bay and Delta region has been invaded by 212 non-native species over the years and currently is being invaded at the accelerated rate of a new species every 24 weeks. These species have been cited as a contributing factor in the regional and global extinction of species and in the decrease of endangered marsh birds and mammals. In addition, the report indicates that these species impair many beneficial uses in this region: navigational uses by blocking navigational channels, recreational uses by reducing numbers of sport fish, and commercial uses by reducing the numbers of fish relied on by commercial fisherman. These species constitute "waste" under the Porter-Cologne Act and "pollutants" under the federal Clean Water Act. To the extent these pollutants are impairing the Bay, they should be included as a cause on the proposed list. Because of the great risk posed by these pollutants, BayKeeper asks the Board to consider elevating this to the High priority category for TMDLs (along with the South Bay and the Napa River). We reference *Nonindigenous Aquatic Species in a United States Estuary: A Case Study of the Biological Invasions of the San Francisco Bay and Delta*, Dec. 1995, pgs. i, 188, 196-97.

In conclusion, BayKeeper believes the proposed list improves upon the last 303(d) list, but needs to include the numerous impaired waters within the region. Many of those waters and the supporting data are set forth in the attached list. Undoubtedly, other data which we did not manage to identify exist for other creeks and tributaries to the Bay. BayKeeper believes it is the responsibility of staff to compile that data and make sure that the list is complete. BayKeeper urges the Regional Board to take steps necessary to expand the TMDL process underway in the South Bay to go beyond just copper and nickel and to begin a TMDL for the Napa River. BayKeeper urges the Board to include two more TMDL processes in its high priority category -- a TMDL for dioxin and PCBs throughout San Francisco Bay and a TMDL for exotic species.

BayKeeper Comments
February 2, 1998
Page 4

Thanks again for this opportunity to comment on the 303(d) list update. If you have any questions, please feel free to give me a call at (415) 561-2299 x. 15.

Sincerely,



Michael R. Loxeau
San Francisco BayKeeper

cc. Bill Jennings, DeltaKeeper
Alexis Strauss, EPA Region 9

Table 1**Bodies of Impaired Waters and Pollutants**

Name	Causes	Supporting Documentation
<u>Alameda County</u>		
Alameda Creek	Copper	Draft Annual Monitoring Report 1994-95 for Alameda Countywide Clean Water Program, March 1996, Table 3.2.1-1; Loads Assessment Summary Report, Oct. 31, 1991, p. 2-8, Table 4-12.
	Diazinon	Draft Annual Monitoring Report 1994-95 for Alameda Countywide Clean Water Program, March 1996, p. 3-24, Table 3.2.1-9.
	Lead	Draft Annual Monitoring Report 1994-95 for Alameda Countywide Clean Water Program, March 1996, Table 3.2.1-1.
	Zinc	Loads Assessment Summary Report, Oct. 31, 1991, p. 2-8, Table 4-12.
Castro Valley Creek	Copper	Draft Annual Monitoring Report 1994-95 for Alameda Countywide Clean Water Program, March 1996, Table 3.2.1-1; Loads Assessment Summary Report, Oct. 31, 1991, p. 2-8, Table 4-12.
	Dioxin	Survey of Storm Water Runoff for Dioxins in the San Francisco Bay Area, Feb. 1997, p. 4, Table 2.
	Lead	Draft Annual Monitoring Report 1994-95 for Alameda Countywide Clean Water Program, March 1996, Table 3.2.1-1; Loads Assessment Summary Report, Oct. 31, 1991, p. 2-8, Table 4-12.
	Mercury	Draft Annual Monitoring Report 1994-95 for Alameda Countywide Clean Water Program, March 1996, Table 3.2.1-1.
	PAHs	Loads Assessment Summary Report, Oct. 31, 1991, p. ES-7, Table 4-6.
	Zinc	Draft Annual Monitoring Report 1994-95 for Alameda Countywide Clean Water Program, March 1996, Table 3.2.1-1; Loads Assessment Summary Report, Oct. 31, 1991, p. 2-8, Table 4-12.
Chicken Creek	Tritium	RFI Phase I Progress Report 11/94 Environmental Restoration Program, Lawrence Berkeley Labs.

Codornices Creek	Copper	Loads Assessment Summary Report, Oct. 31, 1991, p. 2-7, Table 4-12.
	Lead	Loads Assessment Summary Report, Oct. 31, 1991, p. 2-7, Table 4-12.
	PAHs	Loads Assessment Summary Report, Oct. 31, 1991, p. ES-7, p. 2-7, Table 4-6.
	Zinc	Loads Assessment Summary Report, Oct. 31, 1991, p. 2-7, Table 4-12.
Crandall Creek	Diazinon	Draft Annual Monitoring Report 1994-95 for Alameda Countywide Clean Water Program, March 1996, p. 3-24.
Pineapple Creek	Tritium	RFI Phase I Progress Report 11/94 Environmental Restoration Program, Lawrence Berkeley Labs.
Duis Landing Creek	Temperature	Watershed Monitoring by Volunteers FY 94-95 Pilot Study p. 3-7.
	Dissolved Oxygen	Watershed Monitoring by Oxygen Volunteers FY 94-95 Pilot Study, p. 3-7.
San Lorenzo Creek	Copper	Loads Assessment Summary Report, Oct. 31, 1991, p. 2-8, Table 4-12.
	Lead	Loads Assessment Summary Report, Oct. 31, 1991, p. 2-8, Table 4-12.
	PAHs	Loads Assessment Summary Report, Oct. 31, 1991, ES-7, p. 2-8, Table 4-6.
	Zinc	Loads Assessment Summary Report, Oct. 31, 1991, p. 2-8, Table 4-12. Contra Costa County
Marsh Creek Reservoir	Mercury	Marsh Creek Watershed 1995 Mercury Assessment Project, Final Report, March 1996, p. 63..
Pacheco Creek	Copper	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Nickel	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
Rheem Creek	Copper	Contra Costa Clean Water Program FY 1995-96 Monitoring Report, Sept. 1, 1996, Table 3.2-1.
	Chlorpyrifos	Contra Costa Clean Water Program FY 1995-96 Monitoring Report, Sept. 1, 1996, p. 4, Table 3.2-20.

	Diazinon	Contra Costa Clean Water Program FY 1995-96 Monitoring Report, Sept. 1, 1996, p. 4, Table 3.2-20.
	Dioxin	Survey of Storm Water Runoff for Dioxins in the San Francisco Bay Area, Feb. 1997, p. 4, Table 2.
	Lead	Contra Costa Clean Water Program FY 1995-96 Monitoring Report, Sept. 1, 1996, Table 3.2-2.
	Mercury	Contra Costa Clean Water Program FY 1995-96 Monitoring Report, Sept. 1, 1996, Table 3.2-7.
	Zinc	Contra Costa Clean Water Program FY 1995-96 Monitoring Report, Sept. 1, 1996, Table 3.2-3.
Walnut Creek	Chlorpyrifos	Contra Costa Clean Water Program FY 1995-96 Monitoring Report, Sept. 1, 1996, p. 4, Table 3.2-20.
	Copper	Contra Costa Clean Water Program FY 1995-96 Monitoring Report, Sept. 1, 1996, Table 3.2-1.
	Diazinon	Contra Costa Clean Water Program FY 1995-96 Monitoring Report, Sept. 1, 1996, p. 4, Table 3.2-20.
	Dioxin	Survey of Storm Water Runoff for Dioxins in the San Francisco Bay Area, Feb. 1997, p. 4, Table 2.
	Lead	Contra Costa Clean Water Program FY 1995-96 Monitoring Report, Sept. 1, 1996, Table 3.2-2.
	Mercury	Contra Costa Clean Water Program FY 1995-96 Monitoring Report, Sept. 1, 1996, Table 3.2-7.
<u>Santa Clara County</u>		
Adobe Creek	Chromium	Data from City of Palo Alto Environmental Compliance Division, p. 5.
	Copper	Data from City of Palo Alto Environmental Compliance Division, p. 5.
	Lead	Data from City of Palo Alto Environmental Compliance Division, p. 5.
	Mercury	Data from City of Palo Alto Environmental Compliance Division, p. 5.
	Zinc	Data from City of Palo Alto Environmental Compliance Division, p. 5.

Artesian Slough	Copper	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 1, Appendix B.
	Mercury	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 1, Appendix B.
	Nickel	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 1, Appendix B.
Barron Creek	Chromium	Data from City of Palo Environmental Compliance Division, p. 4.
	Copper	Data from City of Palo Environmental Compliance Division, p. 4.
	Lead	Data from City of Palo Environmental Compliance Division, p. 4.
	Mercury	Data from City of Palo Environmental Compliance Division, p. 4.
	Zinc	Data from City of Palo Environmental Compliance Division, p. 4.
Bear Creek	Chlorpyrifos	Data from City of Palo Alto Environmental Compliance Division, p. 1.
	Copper	Data from City of Palo Alto Environmental Compliance Division, p. 1.
	Diazinon	Data from City of Palo Alto Environmental Compliance Division, p. 1.
	Mercury	Data from City of Palo Alto Environmental Compliance Division, p. 1.
	Zinc	Data from City of Palo Alto Environmental Compliance Division, p. 1.
Calabazas Creek	Copper	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 2, Appendix B.
	Mercury	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 2, Appendix B.
	Nickel	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 2, Appendix B.
Coyote Creek	Anthracene	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.

	Benzo(a)pyrene	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Benzo(b)-fluoranthene	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Copper	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Figs. 1-2, Appendix B; Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Dieldrin	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Heptachlor Epoxide	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Indeno(1,2,3-cd) pyrene	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Lead	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Mercury	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Figs. 1-2, Appendix B; Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Nickel	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Figs. 1-2, Appendix B; Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	PAH's	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	PCBs	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	ppDDD	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	ppDDE	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
Guadalupe River	Copper	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 2, Appendix B.
	Dioxin	Survey of Storm Water Runoff for Dioxins in the San Francisco Bay Area, Feb. 1997, p. 4, Table 2.
	Nickel	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 2, Appendix B.

Guadalupe Slough	Chromium	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 1, Appendix B.
	Copper	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 1, Appendix B.
	Lead	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 1, Appendix B.
	Mercury	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 1, Appendix B.
	Nickel	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 1, Appendix B.
Matadero Creek	Cadmium	Data from City of Palo Alto Environmental Compliance Division, p. 3.
	Chlorpyrifos	Coyote Creek Riparian Station Report, Jan. 21, 1997, p. 3 in West Valley Communities 1996-97 Annual Report.
	Chromium	Data from City of Palo Alto Environmental Compliance Division, p. 3.
	Copper	Data from City of Palo Alto Environmental Compliance Division, p. 3.
	Diazinon	Coyote Creek Riparian Station Report, Jan. 21, 1997, p. 3 in West Valley Communities 1996-97 Annual Report.
	Lead	Data from City of Palo Alto Environmental Compliance Division, p. 3.
	Mercury	Data from City of Palo Alto Environmental Compliance Division, p. 3.
Mowry Slough	Zinc	Data from City of Palo Alto Environmental Compliance Division, p. 3.
	Copper	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 1, Appendix B.
	Lead	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 1, Appendix B.
	Mercury	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 1, Appendix B.

	Nickel	Evaluation of Nine Metals of Concern Vol. II, Aug. 30, 1996, Fig. 1, Appendix B.
Redwood Creek	PAHs	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	PCBs	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
San Francisquito Creek	Chlorpyrifos	Coyote Creek Riparian Station Report, Jan. 21, 1997, p. 3 in West Valley Communities 1996-97 Annual Report.
	Chromium	Data from City of Palo Alto Environmental Compliance Division, p. 2.
	Copper	Data from City of Palo Alto Environmental Compliance Division, p. 2.
	Diazinon	Coyote Creek Riparian Station Report Jan. 21, 1997 p. 3 in West Valley Communities 1996-97 Annual Report.
	Lead	Data from City of Palo Alto Environmental Compliance Division, p. 2.
	Mercury	Data from City of Palo Alto Environmental Compliance Division, p. 2.
	Zinc	Data from City of Palo Alto Environmental Compliance Division, p. 2.
Saratoga Creek	Coliform	Urban Creek Assessment Project data; Friends of Santa Clara County Creeks data; BayKeeper data; City of Saratoga data
West Union Creek	Chlorpyrifos	Data from City of Palo Alto Environmental Compliance Division, p. 1.
	Diazinon	Data from City of Palo Alto Environmental Compliance Division, p. 1.
<u>North Bay</u>		
Napa River	Copper	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Dioxin	Survey of Storm Water Runoff for Dioxins in the San Francisco Bay Area, Feb. 1997, p. 4, Table 2.
	Nickel	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.

Petaluma River	PAHs	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	PCBs	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	ppDDE	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Anthracene	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Benzo(a)pyrene	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Benzo(b)-fluoranthene	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Chromium	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Diazinon	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Heptachlor Epoxide	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Indeno(1,2,3-cd)pyrene	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Mercury	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Nickel	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	PAHs	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	PCBs	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	ppDDD	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	ppDDE	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	ppDDT	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.

San Francisco Bay

San Francisco Bay - Generally

	Dioxin	Contaminant Levels in Fish Tissue from San Francisco Bay, Final Report, June 1995, p. iv, Table 5.
	PCBs	Toxic Pollutants, Health Indices, and Population Dynamics of Harbor Seals in San Francisco Bay 1989-1992, Oct. 10, 1995, p. vi-vii; Contaminant Levels in Fish Tissue San Francisco Bay, Final Report, June 1995, p. iii.
	Exotic Species	Nonindigenous Aquatic Species in a United States Estuary: A Case Study of the Biological Invasions of the San Francisco Bay and Delta, Dec. 1995, pgs. i, 188, 196-97.
	Lead	Toxic Pollutants, Health Indices, and Population Dynamics of Harbor Seals in San Francisco Bay 1989-1992, Final Report, Oct. 10, 1995, p. vii, Fig. 19.
	Mercury	Toxic Pollutants, Health Indices, and Population Dynamics of Harbor Seals in San Francisco Bay 1989-1992, Oct. 10, 1995, p. vii, Fig. 20; Contaminant Levels in Fish Tissue from San Francisco Bay, Final Report, June 1995, pgs. iii-iv, Table 5.
	Nickel	Toxic Pollutants, Health Indices, and Population Dynamics of Harbor Seals in San Francisco Bay 1989-1992, Oct. 10, 1995, p. viii, Fig. 21.
	Cadmium	Toxic Pollutants, Health Indices, and Population Dynamics of Harbor Seals in San Francisco Bay 1989-1992, Oct. 10, 1995, p. vii, Fig. 17.
	Chlordanes	Contaminant Levels in Fish Tissue from San Francisco Bay, Final Report, June 1995, p. iv, Table 5.
	DDT	Contaminant Levels in Fish Tissue from San Francisco Bay, Final Report, June 1995, p. iv, Table 5.
	Dieldrin	Contaminant Levels in Fish Tissue from San Francisco Bay, Final Report, June 1995, p. iv, Table 5.
	Selenium	Toxic Pollutants, Health Indices, and Population Dynamics of Harbor Seals in San Francisco Bay 1989-1992, Oct. 10, 1995, p. viii, Fig. 22.
Lower South Bay	Cadmium	Evaluation of Nine Metals of Concern Vol. II, Aug. 1996, Fig. 2, Appendix B.

	Selenium	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Figures 18-19.
South San Francisco Bay		
	Selenium	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Figures 18-19.
San Pablo Bay	Heptachlor Epoxide	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Nickel	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	PAHs	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	PCBs	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	ppDDE	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
Grizzly Bay	Copper	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Heptachlor Epoxide	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Mercury	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	Nickel	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	PCBs	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
Honker Bay	Copper	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
Mare Island Strait/ Austin Creek	Coliform	Self-Monitoring Reports of the Vallejo Sanitation District - wet weather overflows at Sears Point Pump Station
Sacramento River	Dieldrin	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.
	PCBs	Regional Monitoring Program for Trace Substances, 1995 Annual Report, Table 13.

|| San Joaquin River Heptachlor

Regional Monitoring Epoxide Program for Trace Substances,
1995 Annual Report, Table 13.

PCBs

Regional Monitoring Program for Trace Substances, 1995
Annual Report, Table 13.



COMMUNITIES FOR A
BBETTER
ENVIRONMENT



January 30, 1998

Loretta K. Barsamian, Executive Officer
Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, CA 94612

Re: The 1998 Water Quality Assessment of the 303(d) List of Impaired Water Bodies for the San Francisco Bay Region - Comments of CBE

Dear Ms. Barsamian:

CBE urges you to include dioxin and PCBs as a high priority in your "303(d)" Priority List. This action will aid urgently needed pollution prevention plans for the Region, and ample evidence demonstrates that severe pollution threats to public health and aquatic life from dioxin and PCBs is a top priority for action to protect and restore priceless Bay Area waters.

Dioxin exceeds water quality standards by hundreds of times in streams and in massive storm water runoff discharges to San Francisco Bay. Dioxin exceeds effluent limits in widespread ongoing waste water discharges to the Bay. PCBs releases are ongoing as well, and a major portion of all PCBs used in the watershed still threatens to leak from aging transformers and capacitors. Aquatic life are contaminated by dioxin and PCBs, and evidence strongly suggests fish and wildlife are harmed by these cumulative, extremely toxic compounds. A health advisory demonstrates harm to fishing use of all Bay waters. Subsistence fishers - most people of color - who exercise their rights to fish our Bay for food are exposed to these toxics at levels 50 times greater than this health warning advises is "safe" for childhood neurotoxicity, and face cancer risks 100-1,000 times greater than those California has considered "acceptable" in the past. This pollution is unsolved and ongoing.

We look forward to working with the Board on solutions to these high priority pollution problems. CBE plans to comment on the issue of how to "afford better water quality protection than existing local requirements for water quality-based effluent limitations and Best Management Practices" that is mentioned in the Staff Report. We hope for a chance to discuss these issues in a meeting with Board staff before the February 18, 1998 Board hearing. Thank you for your attention to our requests on this urgent matter.

In Health,


Greg Karras
Senior Scientist

Enclosures: Comments of CBE with seven attachments described therein
cc: Interested agencies and individuals

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**Comments of
Communities for a Better Environment (CBE)**

**before the
Regional Water Quality Control Board
San Francisco Bay Region**

**regarding the
Proposed update of the
Regional Water Quality Assessment
of the 303(d) List of Impaired Water Bodies
Within the San Francisco Bay Region**

January 30, 1998

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I. Introduction.

Thank you for the opportunity to comment on the Regional Board's proposed "1998 Water Quality Assessment of the 303(d) List of Impaired Water Bodies for the San Francisco Bay Region" (the "Priority List"). These comments are submitted on behalf of Communities for a Better Environment (CBE). CBE is a multiracial environmental health and justice organization that works to protect and improve public health and the environment.

Thousands of CBE's members reside in the San Francisco Bay Area and have a direct interest in the use and protection of San Francisco Bay, the environment, and public health. For example, our SAFER project works with low income residents who fish the Bay for recreation and subsistence. We are vitally concerned that the Regional Board set forth appropriate priorities for water quality action and protection.

The evidence introduced into the record with these comments demonstrates that dioxin¹ and PCBs must be included in an appropriate Priority List for San Francisco Bay. Dioxin levels that violate narrative standards in Bay Area streams should also be included in the Priority List. These comments are focused upon our urgent request that the Regional Board include dioxin and PCBs on the Priority List as a high priority problem in these waters.

We believe this evidence shows that the severe pollution problems associated with dioxin-like chemicals in these waters require top priority attention by the Regional Board and others. We intend to provide additional evidence which will further support our request that dioxin and PCBs should be listed as a top priority for action by the Regional Board.

II. The Priority List must identify waters in which narrative criteria are not met and fishing uses are threatened. Section 303(d) of the federal Clean Water Act states that:

"Each State shall identify those waters within its boundaries for which the effluent limitations required by section 1311(b)(1)(A) and section 1311(b)(1)(B) of this title are not stringent enough to implement any water quality standard applicable to such waters." §1313(d)(1)(A).

Federal regulations also require that the Regional Board "shall identify" waters where these effluent limitations and other pollution controls and best management practices "are not stringent enough to implement any water quality standards (WQS) applicable to such waters." 40 CFR 130.7(b)(1). These applicable water quality standards include "numeric criteria, narrative criteria, waterbody uses, and antidegradation requirements." 40 CFR 130.7(b)(3). Fish consumption advisories, impairment of fishing uses, and pollutant levels which violate narrative standards must be considered by the Regional Board.

¹ Dioxin, as used here, refers to all of the dibenzo-para-dioxin, dibenzofuran, and PCBs compounds that exhibit dioxin-like toxicity, or any subset of them. At a minimum there are 28 of these compounds.

As shown below, applicable water quality standards are not implemented due to dioxin and PCBs levels which violate narrative standards and impair or threaten fishing and aquatic life in South Bay, Lower Bay, Central Bay, Richardson Bay, San Pablo Bay, Carquinez Strait, Suisun Bay, the Delta, and surface water streams Region-wide.

III. Dioxin and PCBs must be identified when they threaten or harm our waters.

In addition to identifying threatened and impaired waters, the Priority List "shall identify the pollutants causing or expected to cause violations of the applicable water quality standards." 40 CFR 130.7(b)(4). Thus, in establishing the Priority List, the Regional Board must identify dioxin and PCBs where waters do not achieve standards because these pollutants violate narrative water quality criteria or threaten or impair fishing or aquatic life.

Dioxin should be included in the Priority List for South Bay, Lower Bay, Central Bay, Richardson Bay, San Pablo Bay, Carquinez Strait, Suisun Bay, the Delta, and surface water streams throughout the Region. PCBs should be included in the Priority List for South Bay, Lower Bay, Central Bay, Richardson Bay, San Pablo Bay, Carquinez Strait, Suisun Bay, and the Delta. As shown below, applicable water quality standards are not met for these pollutants in these waters.

IV. The Regional Board must consider at least six bodies of evidence that show dioxin and PCBs threaten public health and aquatic life, impair fishing in the Bay, and violate narrative standards in the Bay and in the Region's streams.

Federal regulations require that the Regional Board "shall assemble and evaluate all existing and readily available water quality-related data and information to develop" the Priority List. At a minimum this includes "[w]aters for which water quality problems have been reported by local, state, or federal agencies; members of the public; or academic institutions" as well as other information. 40 CFR 103.7(b)(5). The following evidence demonstrates that dioxin and PCBs threaten and impair aquatic and fishing uses. This information is readily available to the Regional Board as shown below.

A. Dioxin measurements which show violations of narrative water quality standards in streams carrying storm water runoff, and Bay discharges in excess of water quality-based effluent limit values, are readily available to the Regional Board. Indeed, the February, 1997 "Survey of Storm Water Runoff for Dioxins in the San Francisco Bay Area" was prepared by the Regional Board, and discharger self monitoring reports showing dioxin violations are in Board files. These data are excerpted in Attachment 1.

The Regional Board runoff study confirms the presence of dioxin – dioxins and furans – in recently sampled storm water runoff throughout the Bay Area. Thirty six analyses (including 5 duplicates) are expressed as international toxicity equivalence (or TEQ, used by the World Health Organization, USEPA and Regional Board compliance monitoring to express the additive toxicity of 17 dioxin and furan compounds) in Table 2 of the report. Thirty five of these analyses (97 percent) exceeded the water quality standard criterion value applied by the State in 1991 and proposed by EPA in the California Toxics Rule (0.014 pg/L). These measurements actually underestimate dioxin levels in the runoff, since the study method used assumed that undetected dioxin compounds were at a level of zero.

At least 16 of the samples measured seven streams spanning the Bay Area north to south. Attachment 1 lists measurements of the Napa River, Laurel Creek, Walnut Creek, Rheem Creek, Castro Valley Creek, the Guadalupe River, and Sunnyvale East Channel. Dioxin TEQ exceeds 0.014 pg/L in all of these samples. Eleven of these stream samples (69%) exceed this criteria value by more than 70 times. Eight of these stream samples (50%) exceed the criteria value by more than 350 times.

Concentrations of dioxin compounds exceed water quality-based criteria in streams throughout the Bay Area. Narrative water quality standards are not attained because of dioxin in these streams. These streams must be listed for dioxin in the Priority List.

In addition, dioxin has been measured at levels which exceed the 0.14 pg/L TEQ value applied as an effluent limit in at least 27 samples of treated waste water discharges to the Bay. These discharges in excess of water quality-based limits were reported from at least three oil refineries discharging to Suisun Bay and San Pablo Bay, and at least five sewage treatment plants discharging to the Bay's central and southern reaches. (See Attachment 1.)

B, Dioxin and PCBs measurements that indicate fish contamination which violates narrative standards, impairs fishing, and threatens public health are readily available to the Regional Board. An excerpt from the Board's own June 1995 report "Contaminant Levels in Fish Tissue from San Francisco Bay" is included as Attachment 2. This study shows that PCBs exceed levels of concern for human consumption in 100 percent of 66 fish tissue samples from across the Bay. It found that dioxin exceeds levels of concern in 84% of 19 fish tissue samples from around the Bay. Narrative water quality standards prohibit pollutant accumulations in fish that threaten or harm public health when the fish are consumed. This pollution threat to public health impairs fishing and does not attain these standards. PCBs and Dioxin should thus be included in the Priority List for Bay waters.

C. Bay dioxin and PCBs problems reported by the State Office of Environmental Health Hazard Assessment in a Health Advisory further confirm that dioxin and PCBs impair fishing uses and violate water quality standards. The Health Advisory is based on the Regional Board's fish tissue study data, was issued when the Regional Board released the draft fish tissue study report, and is included as Attachment 3.

This Health Advisory says that people should "limit their consumption of San Francisco Bay sport fish" in order to "protect themselves from potential adverse effects caused by the levels of the chemicals found in fish by the [Regional Board's] study." It states further that its:

"[A]dvice is being issued due to health concerns based on exposure to sport fish from the bay contaminated with methylmercury, polychlorinated biphenyls (PCBs), dioxins, and pesticides... The principle effects of concern (from long-term consumption of fish) are possible neurotoxicity to developing fetuses, infants, and small children (e.g., impaired mental and motor development), mainly associated with excessive methylmercury or PCBs exposure, and potential increased risks for cancer due to exposure to PCBs, dioxins, and the pesticides." See Attachment 3.

A health warning over eating the fish people catch in the Bay demonstrates that use of the Bay for fishing is impaired. Either people eat the fish despite the restrictive advice and suffer from worry or potential health problems, or people restrict their fishing directly. In both cases, fishing use of the Bay is impaired. Water quality standards that protect fishing and public health are not met throughout San Francisco Bay because of PCBs and dioxin. Therefore, these pollutants must be a high priority in the Priority List for all Bay waters.

D. Fish consumption data collected by CBE and others and provided to the Regional Board in Attachment 4 demonstrate a severe public health threat from dioxin and PCBs contamination of fish Bay-wide. This evidence demonstrates that many people eat large amounts of Bay fish, up to an average of one pound per day. Bay anglers, and especially those who eat the most Bay fish, are predominantly low income people and people of color fishing to supplement their family's diet. The Health Advisory in Attachment 3 recommends that women of child-bearing age should eat no more than one eight ounce meal of Bay fish per month. People who eat a pound a day are exposed to dioxin- and PCBs-tainted fish at more than 50 times the recommended level. This is a high priority problem.

E. Two papers published in the peer-reviewed scientific literature indicate that harm to aquatic life in San Francisco Bay is associated with PCBs. This water quality problem was reported in the journal Marine Biology by academic researchers associated

with the University of California, Livermore. The two scientific papers are included as Attachment 5. These papers link PCBs to a biochemical "marker" of toxicity (aryl hydrocarbon hydroxylase) and reduced reproduction in starry flounder from the Bay. They provide strong evidence that PCBs in the Bay affect reproduction of fish adversely. Thus, PCBs harm or at least threaten Bay aquatic life. Therefore, the Bay does not meet water quality standards that assure protection of aquatic life because of PCBs. PCBs must be included in the Priority List of Bay waters.

F. PCBs analysis of harbor seal blood provides further evidence that PCBs pose a serious threat to aquatic life. The report "Toxic Pollutants, Health Indices, and Population Dynamics of Harbor Seals in San Francisco Bay, 1989-1992" is based on research by scientists associated with Moss Landing Marine Laboratories. An excerpt of the report including PCBs data and analysis is included in Attachment 6. A carefully described analysis by these researchers found that: "PCB residues in San Francisco Bay seal blood is greater than twice (2.7x's) as high as residue levels associated with reproductive and immunological disorders in Wadden Sea harbor seals." San Francisco Bay does not attain water quality standards protecting aquatic life from PCBs, including a high priority protected marine mammal.

V. Ongoing releases of dioxin and PCBs to water pose substantial threats to public health and aquatic life which are only exacerbated by persistent past pollution.

The January 7, 1998 Staff Report on the proposed Priority List (the "Staff Report") suggests that some water quality problems need not be listed because they "have already been addressed by local regulatory programs." It further suggests that other water quality problems need not be included in the Priority List because "current data suggest these levels [of pollution] are due to historic and not ongoing discharges." However, even if these situations were valid reasons for failure to list an existing pollution problem, neither situation applies here. In fact, ongoing dioxin and PCBs discharge is a high priority problem.

A. Ongoing releases to Bay Area streams and to the Bay demonstrate a continuing threat from dioxin pollution which has not been addressed by technology-based effluent limits and other existing requirements. The Regional Board evidence excerpted in Attachment 1 proves widespread recent dioxin releases to creeks and massive runoff discharges to the Bay at levels which dwarf water quality standards criteria values. Half of these stream samples exceeded these values by hundreds of times, as discussed above. Further, discharger monitoring given to the Board shows widespread recurrent dioxin levels in treated waste water releases to the Bay from major dischargers, including oil refineries

and sewage treatment plants, that exceed water quality-based effluent limits on dioxin,

Widespread ongoing dioxin releases above standards and effluent limit values disprove any claim that dioxin pollution of these waters has "already been addressed" or is due solely to "historic and not ongoing discharges." The rationale in the Staff Report cannot properly be used to exclude dioxin from the Priority List.

B. Present PCBs sources and ongoing PCBs releases to the Bay demonstrate a continuing threat to water which has not been addressed by technology-based effluent limits and other existing requirements. Attachment 7 provides evidence of continuing PCBs release to the the environment and to San Francisco Bay. Ongoing PCBs releases to the Bay (indirectly through runoff) are confirmed from the I.E.S. incinerator by 1996 stack measurements made after new emissions control technology was installed. (See Harding Lawson, 1996. Excerpt in Attachment 7.) Ongoing PCBs releases in treated sewage effluent discharged directly to the Bay are confirmed as well. (See the EIP report, page 6.)

The EIP report also makes the critically important point that spills and leaks from old electrical equipment can still put significant amounts of PCBs into the Bay. Approximately 650,000 metric tons of PCBs were produced in the U.S. (See page 3 of Webster and Commoner, 1992.) An Air Resources Board report estimated that in 1980, PCBs in-use in capacitors and transformers would take 20 years and 40 years to phase out of service, respectively. Consistent with this estimate, the EIP report estimated that by 1982, only 11% of PCBs produced had entered the environment. By 1992, Webster and Commoner estimated that this fraction had grown to only 20-30% of PCBs produced. (See Attachment 7.)

PCBs are still put into the Bay through stack emissions, runoff and treated waste water discharges. Further, a major portion of all the PCBs ever used in the Bay's watershed are in aging electrical equipment that threatens to leak, and certainly has not "been addressed by local regulatory programs" which have not identified and contained them. The problem is not fixed or in the past: PCBs releases pose high priority water quality threats now.

C. Past pollution increases the need to stop dioxin and PCBs pollution now because it exacerbates the effects of ongoing pollution. Far from excusing exclusion of pollutants from the Priority List, PCBs pollution already in the Bay's food chain increases the need prevent ongoing PCBs and dioxin pollution. As Dr. William Farland and Dr. Arnold Schecter testified at the Regional Board's May 7, 1997 dioxin workshop, the overwhelming burden of evidence for the best-studied group of toxins to day indicates that the toxicity of the dioxin-like PCBs and other dioxins and furans is additive.

Thus, when the PCBs and dioxin/furan TEQ calculations, which are presented separately for the fish tests in Attachment 2, are added, the total dioxin-like toxicity is far greater than it is for dioxins and furans alone. A recent USEPA analysis of this issue was included with the proposed California Toxics Rule, which is readily available to the Regional Board, was cited in the Staff Report, and is included in Attachment 7. This EPA analysis found that exposure to PCBs and dioxin from moderately high consumption of San Francisco Bay fish (about one-fourth of a pound per day) poses an incremental cancer risk of nearly 1-in-1,000. This risk level is 100-1,000 times greater than California has considered "acceptable" in the past. This evidence of cumulative effects further demonstrates that dioxin and PCBs are a top priority for Regional Board action to protect water quality and public health.

VI. Conclusion.

Pursuant to federal law and regulations, the "303(d)" Priority List proposed here by the Regional Board must identify all waters in the Region that do not achieve water quality standards after technology-based effluent limitations and other existing controls are in place, as well as the pollutants that violate or are expected to violate these standards.

Although technology-based limits and other controls are in place, ongoing dioxin and PCBs pollution poses serious and substantial threats to aquatic life and public health. Further, waters throughout San Francisco Bay do not achieve applicable standards because dioxin and PCBs impair fishing and threaten public health and aquatic life, and all streams sampled Region-wide are contaminated with dioxin at levels far above water quality criteria.

Thus, the "303(d)" Priority List must include dioxin and PCBs violating water quality standards in the Delta, Suisun Bay, Carquinez Strait, San Pablo Bay, Central Bay, Richardson Bay, Lower Bay, and South Bay. In addition, the Priority List must include streams throughout the Region and include dioxin violating water quality standards in these streams. These listings are needed to assure timely, orderly and appropriate planning and actions to protect and restore these waters.

Therefore, CBE strongly urges and requests that the Regional Board: 1) add dioxin and PCBs to the Priority List for all Bay waters as set forth above; 2) add streams in the Region to the Priority List for dioxin problems as set forth above; and 3) list dioxin compounds and PCBs as high priorities for action.

LIST OF ATTACHMENTS

1. RWQCB, 1997. Survey of Storm Water Runoff for Dioxins in the San Francisco Bay Area. (Excerpt); and a summary of selected dioxin measurements of treated waste water discharges from various discharger self monitoring reports submitted to the Regional Board.
2. RWQCB, SWRCB and CDFG, 1995. Contaminant Levels in Fish Tissue from San Francisco Bay. (Excerpt.)
3. OEHHA, 1994. Health Advisory on Catching and Eating Fish, Interim Sport Fish Advisory for San Francisco Bay.
4. Previously unpublished data from a 1993-4 survey of 500 anglers using South and Central San Francisco Bay by Communities for a Better Environment-SAFER!; Save San Francisco Bay Association, 1995 (excerpt); West, 1992; West et al., 1992; Peterson et al., 1994; and USEPA, 1994 (excerpt of a draft report discussing and citing work by EPA, Wolfe and Walker (1987), Svensson (1991) and others. Includes analysis of the evidence.
5. Spies et al., 1988. Effects of organic contaminants on reproduction of the starry flounder *Platichthys stellatus* in San Francisco Bay, I. Hepatic contamination and mixed-function oxidase (MFO) activity during the reproductive season. Marine Biology 98: 181-189; and Spies and Rice, 1988. Effects of organic contaminants on reproduction of the starry flounder *Platichthys stellatus* in San Francisco Bay, II. Reproductive success of fish captured in San Francisco Bay and spawned in the laboratory. Marine Biology 98: 191-200.
6. Kopec and Harvey, 1995. Toxic Pollutants, Health Indices, and Population Dynamics of Harbor Seals in San Francisco Bay, 1989-1992. Moss Landing Marine Laboratories Technical Publication 96-4. ISSN 1088-2413. October, 1995. (Excerpt)
7. Harding Lawson Associates, 1996. Risk Analysis Report: Medical waste incinerators (Units S-5 and S-6) Integrated Environmental Systems, Inc., Oakland, California. Prepared for submission to the Bay Area Air Quality Management District (Excerpt including evidence of PCBs emissions); EIP Associates, 1997. Polychlorinated biphenyls (PCBs) Source Identification. Prepared for the Palo Alto Regional Water Quality Control Plant (Excerpt including evidence of PCBs release to the Bay and sources of these PCBs); Webster and Commoner, 1994. Overview - The Dioxin Debate. (Chapter 1 of *Dioxins and Health*, Arnold Schecter, Ed.) Plenum Press; State of California Air Resources Board, 1980. Disposal of Polychlorinated Biphenyls in California (Excerpt including estimates of the volume of PCBs and their service life in electrical equipment after the 1979 ban.); and USEPA, 1997. Economic Analysis of the Proposed California Toxics Rule. Office of Water. EPA-823-R-97-004. July, 1997 (Excerpt.)



Natural Resources
Defense Council

February 2, 1998

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Via Facsimile and U.S. Mail

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California Regional Water Quality Control Board,
Region 2
2101 Webster Street, Suite 500
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CALIFORNIA REGIONAL WATER
FEB - 5 1998
QUALITY CONTROL BOARD

Re: Proposed 1998 CWA Section 303(d) List /San Francisco Bay Region

Dear Mr. Mumley:

Please accept these additional comments on the 303(d) List on behalf of NRDC, the Santa Monica BayKeeper, and Terry Tamminen.¹ We have previously written to indicate our views on the matter of Section 303(d) and (e) implementation by your regional board and the state as a whole, and we incorporate those comments contained in our November 25, 1997 letter by reference. We do not intend to restate those previous comments here but rather set forth additional comments in light of Region 2's most recent Section 303(d) List, which was made available in January, 1998.

Comprehensive listing of impaired and threatened water bodies requiring TMDLs.

We remain concerned that Region 2's proposed 303(d) list is not based on a comprehensive assembly and review of information and data on water quality and other impairments regarding all water bodies in Region 2, as the Clean Water Act and its implementing regulations require. See, e.g., 40 C.F.R. Section 130.7. Indeed, wholly apart from the Section 303(d) scheme, under Clean Water Act Section 305(b) and accompanying regulations, each regional board is to conduct a regional water quality assessment (WQA) of all water bodies in its region. However, the Staff Report states explicitly that the proposed 303(d) List is based on an assessment that was primarily focused on Bay segments, with little or no assessment of other water bodies in Region 2.² Staff Report, page 1. Given the vast number of potentially applicable streams and rivers in the Bay Area, it seems clear that the Regional Board has not fully considered available data nor fully assessed waters within the region, as required. The vague assurances that

¹ In connection with these comments, we have also reviewed the materials accompanying the proposed 1998 303(d) List including the "Staff Report: Proposed Revisions to Section 303(d) List and Priorities for Development of Total Maximum Daily Loads (TMDLs) for the San Francisco Bay Region" (Staff Report). Thank you for providing a copy of these materials. Citations in this comment letter refer to these materials.

² The Staff Report states: "This assessment process began with a review of all readily available water quality data - most of which focused on Bay segments...Little or no new data are readily available for other water bodies in the Region." Staff Report, page 1.

"we intend to make improved monitoring and assessment a high priority over the next two years" and that "opportunities for improved monitoring and assessment" will result from "existing and planned watershed management efforts" are no substitute for the required complete assessment of Region 2. Staff Report, page 1.

We believe that the essential starting point under Section 303(d) is to comprehensively survey and review the status of all of Region 2's water bodies so that the resulting list, if implemented with the establishment of TMDLs, will address continuing impairment throughout Region 2. We believe it is incumbent upon your regional board to undertake such a survey.

Criteria for Listing of Waterbody/Pollutants

Staff has created an overly-restrictive process of selecting waterbody/pollutants for 303(d) listing that bears no relationship to statutory or regulatory requirements nor state or federal guidance. According to the Staff Report, after reviewing available data, Staff eliminated from consideration water bodies that fall within two general situations: (a) "where water quality problems have already been addressed by local regulatory programs, including water quality-based effluent limitations;" and (b) "where there was insufficient information available to determine if a TMDL process would afford better water quality protection than existing local requirements." Staff adds that it will "reconsider" those waterbody/pollutants excluded under this scheme in ongoing monitoring and assessment and the next revision of the 303(d) list in 2000. Staff Report, page 2.

Exclusion under situation (a) is contrary to law. Section 303(d) and its implementing regulations, 40 C.F.R. Section 130.7, require listing of all impaired water bodies. EPA guidance does indicate that if a control has been instituted that (1) is enforceable, (2) specific to the pollution/stressor problem, and (3) stringent enough to lead to attainment of water quality standards within the next two years that listing may not be necessary. See EPA Guidance for 1994 Section 303(d) Lists, November 26, 1996; Guidance for Water Quality-Based Decisions: The TMDL Process (April, 1991). While this guidance departs from the statute, even it does not go as far as Region 2 would in excluding waters from the Section 303(d) list. There is no evidence that any of the "local regulatory" efforts cited by staff meet the guidance standard. To the contrary, staff give as an example of situation (a) "cooperative" efforts to protect beneficial uses which are clearly insufficient under the federal guidance. Staff Report at 2.

Exclusion under situation (b) for lack of information is untenable given Region 2's obligation to conduct comprehensive assessment, as discussed above. Further, there is no provision in law or any guidance for the so-called "feasibility assessment" that Region 2 proposes to do before listing a water body for situation (b). Again, listing is related to water body impairment, and nothing else. As if to underscore this point, EPA guidance requires listing when standards are exceeded due to atmospheric deposition,

unknown sources, and even when standards or criteria are in the process of revision. National Clarifying Guidance for 1998 Clean Water Act Section 303(d) Listing Decisions. Similarly, Section 303(d) contains no exclusion for waters impaired by historic (or legacy) activities and the current draft TMDL Federal Advisory Committee report affirmatively requires listing for waters wholly or partially impaired due to past activities. See draft FACA Report at 48.

In short, the current Section 303(d) list is flatly contrary to law for reasons including these.

Preparation of TMDLs/schedule.

TMDLs should have been completed by the late 1970s. CWA Section 303(d)(2). Accordingly, TMDLs should be prepared immediately for all listed water bodies. We strongly believe that it is the Board's obligation to manage its resources and conduct its business to ensure that TMDLs are developed quickly and efficiently. Given that TMDLs were due approximately twenty years ago, this obligation is manifest and long overdue.

We dispute, with respect to a number of points, the adequacy of the schedule not only because of our view of the relevant legal requirements, but also because the schedule does not comport with state guidance (that is itself far too lenient) and other federal regulations. The TMDL schedule fails to make the necessary commitment to TMDL development because it extends for more than a decade (hardly immediate implementation) and is, further, too extensively qualified.³ The Staff Report qualifies the entire TMDL schedule as follows: "Schedules for TMDL development after the first two years should be regarded as very tentative." Staff Report, page 3. We believe that this caveat is so open-ended that it effectively renders the schedule meaningless.⁴

In addition, we are concerned about manner in which Staff has interpreted state guidelines regarding scheduling levels. According to the Staff Report, Staff has linked priority rankings to scheduling levels such that High priority TMDLs are Level 1,

³ We also wish to note that the 303(d) List is incomplete in that the listing for Suisun Marsh Wetlands/Low D.O. shows no entries for priority, size affected, unit and TMDL start and end dates.

⁴ According to the State Section 303(d) Listing Guidelines, caveats such as the one above are appropriate only for Level 3 TMDLs, those projected to be completed between five and thirteen years from the present. Scheduling at Level 2 is for TMDLs "to be initiated over the next five years" and should be based on TMDL activities for which "RWQCBs are actively seeking funding support" and/or "funding is reasonably likely to become available." Guidelines, page 5. Thus, the Staff's general qualification of the entire TMDL schedule after the first two years renders the Board's commitment to Level 2 TMDLs much less reliable than required by the state guidelines. It is important to note that we do not think that any scheduling caveats are warranted or appropriate. Nevertheless, it is relevant that the scheduling at issue is inconsistent with guidance issued by the State, even though this guidance is far too lenient. As noted above, the duty at issue is to immediately establish all TMDLs, not to do so over more than a decade.

Medium priority Level 2 and Low priority Level 3. Staff has failed to implement key aspects of the state guidelines. Firstly, staff redefines scheduling Level 1 as follows: "[t]hose ranked as "High" are expected to commence within the next two years." Staff Report, page 2. However, state guidelines define Level 1 as "cases where substantial work on TMDL development is expected during the next two years." Guidelines, page 5 (emphasis added). Thus, merely "commencing" a High priority TMDL within two years runs counter to state guidelines. In any case, the prioritization process must be driven by factors other than logistics (see below).

A review of the Board's TMDL scheduling over the last two years prompts even greater concern over the credibility of the present TMDL schedule and the Board's overall commitment to TMDL development. Having consulted the Board's 1996 303(d) List and the 1997 WMI, we find that many previous schedules for TMDL development have slipped. Specifically, in all of the following cases, completion dates for High priority TMDLs were not set in the 1996 303(d) List, were then slated in the 1997 WMI for the year 2000 and are now postponed until 2003 in the proposed 1998 303(d) List.

South San Francisco Bay/Metals
Calero Reservoir/Mercury
Guadalupe Reservoir/Mercury
Alamitos Creek/Mercury
Guadalupe Creek/Mercury
Guadalupe River/Mercury
Napa River/Nutrients, Pathogens, Siltation

This record of apparently inconstant efforts and faltering commitment draws into question the reliability of the proposed 303(d) List. We believe that these proposed delays - delays above and beyond previous RWQCB commitments to establish TMDLs which themselves failed to meet legal requirements - are similarly inconsistent with the mandate of Section 303(d).

Description of process for implementing the Section 303(d) scheme in its Continuing Planning Process Document.

Section 303(d) and (e) implementing regulations provide that each aspect of the Section 303(d) and (e) process be "clearly described" in continuing planning documents. Unfortunately, we are unable to find any document maintained by the State or your board which fulfills this requirement. Further, as discussed immediately above regarding the preparation of TMDLs and the TMDL schedule, the 303(d) List and Staff Report leave the process for achieving the goals of 303(d) and (e) ambiguous at best.

Indeed, the Staff Report suggests that the region does not have an *overall* plan. For example, the Staff Report does not state when the WQA and thus, the 303(d) List, will address the entire region's water bodies. Staff merely states its intention to improve

monitoring and assessment and notes "opportunities for improved monitoring and assessment" arising from current and future watershed management efforts. Staff Report, page 1. No schedule or deadline is provided for completion of the 303(d) process nor are the step-by-step process and funding requirements discussed. The role of the public is similarly uncertain.

The omission of a clear plan for implementing Sections 303(d) and (e) is significant for many reasons. Absent such information, there is no tool by which the program may be fully implemented in the field.

Prioritization.

The Section 303(d) List and accompanying materials do not explain the basis for the "high," "medium" and "low" prioritization contained within the Section 303(d) List. We believe that there must be an explanation of the basis for the priority rankings. A simple listing of the recommended criteria for prioritization is hardly informative. Also, Staff's statement that "[t]he priority ranking, in particular, is based on our existing watershed management planning efforts in the San Clara Basin and Napa River watersheds" requires clarification. Staff Report, page 3. We further believe that the factors enumerated by Section 303(d) itself (severity of impairment and water body significance) must be dispositive. The Board must act consistently with these requirements.

Explanation is also required regarding the lowering of priority rankings of TMDLs for Suisun Bay, Carquinez Strait, San Pablo Bay and Central San Francisco Bay. Although each of these water bodies was listed as Medium priority for metals in the 1996 303(d) List, their 1998 listing shows the Selenium TMDLs as Low priority.

Materials enclosed with 303(d) List.

We appreciate the opportunity to comment on Region 2's 303(d) List before the Board considers and adopts it. However, the limited disclosure provided by Region 2 undermines the potential benefit of this brief comment period. Because a WQA is the foundation for the 303(d) List, we believe that a copy of any WQA consulted in developing the 303(d) List should have been included in the materials accompanying the 303(d) List. Also, where parties have commented upon the draft 303(d) List and the attached materials, copies of these comments and the Staff's responses should accompany the List. Given the ultimate goal of remedying all of Region 2's impaired water bodies through accurate and effective TMDLs, Staff should strive to inform all interested parties as fully as possible in order to maximize the quality and productivity of the comment period.

Sufficiency of TMDLs.



CITY OF SAN JOSE, CALIFORNIA

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CALIFORNIA REGIONAL WATER

FEB - 5 1998

QUALITY CONTROL BOARD

February 2, 1998

Dr. Thomas Mumley
San Francisco Bay Regional Water Quality Control Board
2101 Webster Street, Suite 500
Oakland, California 94612

**RE: City of San Jose Comments on the "1998 Water Quality Assessment of the
303(d) List of Impaired Water Bodies for the San Francisco Bay Region"**

Dear Dr. Mumley:

The City of San Jose is submitting these comments on the 1998 Water Quality Assessment of the 303(d) List of Impaired Water Bodies for the San Francisco Bay Region on behalf of the San Jose/Santa Clara Water Pollution Control Plant (Plant), including the Cities of San Jose and Santa Clara and the Plant tributary agencies, and on behalf of the City itself as a municipal stormwater discharger.

Under terms of the Joint Powers Agreement between the Cities of San Jose and Santa Clara, San Jose acts as the administering agency for the Plant. The service area for the Plant serves approximately 1.25 million residents and 16,000 businesses, including many of the leading computer and electronics manufacturers that make up "Silicon Valley." The Plant provides wastewater treatment services to the Cities of Milpitas, San Jose and Santa Clara, West Valley Sanitation District (Cities of Campbell, Los Gatos, Monte Sereno and Saratoga), Burbank Sanitary District, Cupertino Sanitary District (City of Cupertino), Sunol Sanitary District, and County Sanitation District No. 2-3.

The City of San Jose is responsible for a storm water collection system that serves almost 900,000 people and drains over 89,000 acres with some 850 miles of storm drain lines, 26,000 storm drain inlets and 600 outfalls. The City operates the system subject to a NPDES municipal separate storm sewer system permit and waste discharge requirements issued in August 1995.



Mr. Tom Mumley
February 2, 1998
Page 6

While the board is not being asked to approve TMDLs, when and if TMDLs are prepared, it is essential that they comply with the requirements set forth in the Clean Water Act and its implementing regulations. TMDLs must have a set of constituent parts. We believe that any TMDLs prepared must, among other things, provide for enforceable numeric limitations for nonpoint and point source pollution. By their very definition, TMDLs include load allocations attributable to both point and nonpoint sources. Nothing in the Clean Water Act allows stormwater or nonpoint contributions to impaired water bodies to be ignored or regulated less strictly than point sources.

Thank you for considering these comments. Should you have any questions, please feel free to contact me at the letter head address and phone number.

Very truly yours,



David S. Beckman

cc: Mr. Terry Tamminen, Santa Monica BayKeeper
Michael Lozeau, Esq. San Francisco BayKeeper
Steven Fleischli, Esq.

We generally support the approach taken by Regional Board staff in developing the 1998 303(d) list through a comprehensive water quality assessment process that considers all readily available water quality information. The City supports the Regional Board's intention to improve monitoring and assessment activities to improve the year 2000 waterbody assessment process. In addition, the City agrees that watershed management and planning efforts currently underway through the Watershed Management Initiative, provide opportunities for improved monitoring and assessment of South Bay waterbodies.

The City generally supports the Regional Board's framework and process to determine water body impairment, but strongly recommends that only specific pollutants or stressors be listed and not generic classes of pollutants (i.e. metals, pesticides, etc.). To best achieve water quality goals, the listing process must be based on scientifically and technically sound data. The information and the manner in which it was applied as the basis of the listing criteria should be well documented to provide a clear administrative record for each listing. Recent legal decisions based on past 303(d) lists mean that each listing could have profound implications on water pollution control programs. TMDL processes required subsequent to a listing designation place a large demand on already limited regulatory resources.

While the City supports the TMDL process, as evidenced by its voluntary initiation of a TMDL process in the South Bay segment for copper and nickel, the effort is resource and time intensive. Given our experience with the current TMDL effort in the South Bay, barring an influx of additional resources from sources external to the City, the year 2003 TMDL completion date for all other TMDL's required by this listing process is highly optimistic and should be reconsidered.

Therefore, the City strongly recommends that the Regional Board re-evaluate its proposed 1998 303(d) listing of "pesticides." The City does not believe the current body of scientific evidence is adequate to support a generic pesticide listing for the Lower or South San Francisco Bay segments. The City further believes that the state of scientific knowledge does not support any pesticide listing during this listing cycle. The City recommends that the Regional Board work with interested parties and other stakeholders to collect information needed to make a sound decision during the next listing cycle. The City believes additional monitoring and assessment would best serve the public and recommends coordination of such efforts through the Santa Clara Basin Watershed Management Initiative and the Santa Clara Valley Urban Runoff Pollution Prevention Program.

In summary, the City wishes to be on record supporting the Regional Board's general framework for 303(d) listing in the San Francisco Bay region. In addition, the City supports the removal of the generic classification of "metals" and replacement of this generic metals classification with specific metal listings by Bay area segment. The City agrees there is adequate data and other information to list copper, mercury and nickel in

Dr. Thomas Mumley
February 2, 1998
Page 3

the South San Francisco Bay segment. Questions and/or clarifications of these comments may be addressed to David W. Tucker at 408-945-3711.

We appreciate the opportunity to comment on the 303(d) listing process and look forward to reviewing your response to our comments.

Sincerely,

A handwritten signature in black ink, appearing to read 'CARL W. MOSHER', with a long horizontal line extending to the right.

CARL W. MOSHER

Director

Environmental Services Department



Alameda Countywide Clean Water Program

A Consortium of Local Agencies

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January 28, 1998

Dr. Tom Mumley ✓
Senior Water Resources Control Engineer
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Member
Agencies:

Alameda

Albany

Berkeley

Dublin

Emeryville

Fremont

Hayward

Livermore

Newark

Oakland

Piedmont

Pleasanton

San Leandro

Union City

Alameda
County

Alameda
County
Flood Control
and Water
Conservation
District

Zone 7 of
the Alameda
County
Flood Control
District

Subject: Comments on Proposed Revisions to Section 303(d) List and Priorities for Development of Total Maximum Daily Loads (TMDLs) for the San Francisco Bay Region

Dear Dr. Mumley:

The Alameda Countywide Clean Water Program (ACCWP) supports your efforts to specify in the proposed update which metals are considered a 303(d) problem in different locations of San Francisco Bay. The 1996 Water Quality-Impaired Waterbody (303(d)) List simply used "metals" as the description of this category of pollutant problems. It will be better to focus on the true problem metals rather than waste limited Regional Board, taxpayer, and other resources on non-problems or problems where "there is insufficient information to determine if a TMDL process would afford better water quality protection than existing local requirements..." (Page 2 of Regional Board Staff Report).

We do not support the inclusion of the new category "pesticides" as a cause of impairment of Lower and Central San Francisco Bay because there is no information that shows that diazinon and chlorpyrifos cause water quality toxicity in these areas. Our conclusion is based on the following:

The Regional Monitoring Program measured diazinon concentrations between seven and eight times in the water column from two Lower/Central Bay stations between 1994 and 1996. The highest concentration of diazinon recorded was 13 ng/l at the Yerba Buena Island Station (see enclosed Table summarizing the Regional Monitoring Program's data). This concentration is more than 15 times lower than the 200 ng/l concentration that is reported to cause acute toxicity in the amphipod *Gammarus fasciatus* (Table 4-2 in "Diazinon in Surface Waters in the San Francisco Bay Area: Occurrence and Potential Impact June 1997). This amphipod is shown as the most sensitive species to diazinon in the above mentioned report. This report also concludes that diazinon "less than 150 ng/l is not expected to cause mortality" (page ES-8).

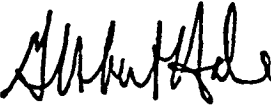
In addition, the above mentioned report concludes, in part, as follows: "Because the adverse impact of diazinon will depend on the specific circumstances of a receiving water, it is impossible to draw a general conclusion that diazinon presence in our urban creeks constitutes an ecological problem."

Regardless of whatever diazinon and chlorpyrifos issues the Regional Board staff believes need to be solved, it would not be productive to list urban runoff/storm sewers as the source of the perceived problem. The ACCWP's member agencies do not use these pesticides in substantive quantities, nor do they manufacture, formulate, or sell these pesticides. The member agencies could not even control or regulate the use and sale of these pesticides if they wanted to because they are statutorily pre-empted by the federal and state government from doing so. Despite these difficult limitations, the ACCWP initiated a yard and garden care educational program in 1997 and has supported the Bay Area Stormwater Management Agencies' regional advertising campaign last spring on proper pesticide use. The ACCWP remains committed to helping implement these type of educational efforts.

The solution to any perceived pesticide problems should be sought from the Department of Pesticide Regulation and the businesses responsible for manufacturing, formulating, selling, or using these pesticides. If you remain unswayed about listing pesticides as a problem, we recommend that the category "nonpoint source" should be added as a source and urban runoff/storm sewers deleted as a source in Table A1 of the 1998 303(d) and TMDL Priority List for San Francisco Bay Region.

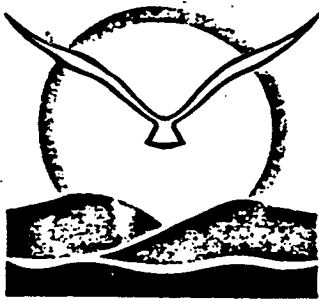
We appreciate your consideration of these comments.

Very truly yours,



G. Robert Hale, Ph.D.
Management Committee Chair

REGIONAL MONITORING PROGRAM				
Diazinon Water Column Data for 1994-1996				
	Alameda (BB70)		Yerba Buena (BC10)	
	Dissolved	Total	Dissolved	Total
Date	(ng/l)	(ng/l)	(ng/l)	(ng/l)
7/26/96	NA	ND	*	*
4/30/96	1.2	1.2	1.7	1.7
2/7/96	9.5	9.5	13.0	13.0
8/16/95	0.9	0.9	0.46	0.46
4/26/95	2.0	2.0	2.4	2.4
2/8/95	7.2	7.2	8.1	8.1
8/17/94	1.2	1.2	0.54	0.54
4/20/94	1.7	1.7	2.8	2.8
2/3/94	NA	NA	NA	NA
Notes: * - No data provided in the RMP report.				
ND - Not determined (per RMP report)				
NA - Not applicable (per RMP report)				
The 1993 RMP Annual Report did not contain diazinon water column data.				
Diazinon was not monitored in sediment or bivalve tissue during the				
1993-1996 RMP surveys.				



Bay Area Dischargers Association

P.O. Box 24055, MS 702
Oakland, California 94623

February 2, 1998

Ms. Loretta Barsamian
Executive Officer
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, CA 94612

CALIFORNIA REGIONAL WATER

FEB - 3 1998

QUALITY CONTROL BOARD

Subject: Proposed Revisions to the Section 303(d) List of Impaired Water Bodies for the San Francisco Bay Region

Dear Ms. Barsamian:

The Bay Area Dischargers Association (BADA) appreciates the opportunity to comment on the proposed Section 303(d) list. Adoption of the 303(d) list is one of the most important and far reaching actions the Regional Board will take. It is important, therefore, that the Board carefully consider all available alternatives before adopting the list. This letter contains BADA's comments on the proposed 303(d) list, including a recommended alternative list.

1. **Adoption of the 303(d) list is an important regulatory action, deserving of careful consideration.**

The adoption of the 303(d) list is important for several reasons. First, it will ultimately lead to the increased regulation of discharges to listed water bodies. Second, it could impact community development. Finally, it will impose resource requirements on the Regional Board. Each of these issues is discussed in greater detail below.

- a. **The listing of a water body will ultimately result in the regulation of discharges to that water body. Once a water body is listed on the 303(d) list, the Clean Water Act (CWA) requires the Regional Board to develop total maximum daily loads (TMDLs) that will result in achievement of the standards that served as the basis for listing. The TMDLs must include an allocation of the load reductions necessary to achieve the standards. The wasteload allocations, in turn, must be incorporated into NPDES permits. Thus, the ultimate outcome of listing a water body on the 303(d) list will be NPDES permit limitations and other control actions that require a reduction in**

discharge concentrations and/or loads. In this sense, the adoption of the 303(d) list is of the same level of importance as the adoption of water quality objectives.

- b. **It may not be feasible to achieve the resulting permit limitations without costly end-of-pipe controls.** A number of the constituents that are listed as causes of impairment on the proposed list (including mercury, copper and "pesticides") are widespread throughout the residential and commercial sectors of our communities. Industries regulated through our industrial pretreatment programs are generally minor sources of these pollutants. For example, Palo Alto studies show that more than half the mercury present in municipal wastewater is estimated to come from residential sources (food, human waste and laundry graywater). Residential sources are also considered to be the primary sources of diazinon and chlorpyrifos, common household pesticides. Copper has been the target of pretreatment programs and pollution prevention programs for a number of years and, in most Bay area communities, the remaining sources are widespread and not easily regulated at the source. In our judgement, further significant reductions in these pollutants in POTW effluents will necessitate the implementation of costly, end-of-pipe controls.
- c. **The listing of a water body could have unanticipated impacts on community growth and development.** Federal regulations could lead to the imposition of unanticipated restrictions on dischargers to listed water bodies. For example, it is being argued at the TMDL FACA that Federal regulations (40 CFR 122.4 (i)) do not allow approval of new discharges to waters that are impaired. It may also be possible to argue that dischargers to impaired waters are not allowed dilution credits for those constituents that were the basis of the listing. Finally, it may be possible to argue that dischargers to impaired waters are not allowed to increase the mass of pollutants they discharge. All of these arguments are untested, but the bottom line is that the listing of a water body could result in the curtailment of new growth and development for those Bay area communities which discharge to listed water bodies. To the extent the Regional Board believes it can prevent these types of unreasonable impacts, BADA is concerned that legal action from environmental groups may take the TMDL development process and related actions out of the Regional Board's purview.
- d. **The 303(d) list will impose significant resource requirements on the Regional Board.** The resources necessary to develop supportable TMDLs are expected to be considerable. For example, the City of San Jose has budgeted \$3 million to develop two TMDLs for one water body, the South Bay. The proposed list would require the development of 60 TMDLs in a total of 21 water bodies. Based on the South Bay estimate, it is not unreasonable to estimate that on the order of \$50 million would be required to develop the TMDLs that will have to be developed if the proposed list is adopted. Under the CWA, the burden of developing TMDLs falls on the States. In the past, the lack of resources has prevented States from developing TMDLs required by previous lists. Recent court decisions make it clear that States will now be forced

to proceed with the development of TMDLs on some reasonable schedule, perhaps a court-ordered schedule.

The regulatory, community development, and resource ramifications of this action are so significant that the Regional Board needs to carefully examine all feasible alternatives prior to acting on the list. In BADA's opinion, such an examination would likely lead to the conclusion to list only those water bodies and constituents which the Regional Board is clearly required to list under the Clean Water Act. Such a list would contain far fewer water bodies and constituents than the list that has been circulated for comment. BADA has proposed such a list later in these comments.

2. The 303(d) list should be as specific as possible.

The primary purpose of the 303(d) list is to identify those waters and constituents for which TMDLs must be developed. A TMDL cannot be developed unless a specific constituent and a numeric goal are identified on the list. Leaving these determinations to the TMDL-development process would likely result in confusion and protracted debate. The list should identify the standard that is being violated and the monitoring data that formed the basis for that conclusion. This serves two purposes. It sets forth the legal basis for the listing and it allows subsequent evaluation of the progress being made toward achievement of the standard.

Based on the above discussion, BADA believes the 303(d) list should include, for each water body listed, the following information:

- The water quality objective contained in the Basin Plan or other applicable State or Federal regulations that is being violated. (e.g., the Basin Plan mercury objective of 0.025 ug/l)
- The specific data that was used as a basis for the determination that the objective is being violated. (e.g., the 1993-1996 RMP data on water column mercury concentrations in San Pablo Bay and Pinole Point monitoring stations)

Only those specific water bodies where monitoring data show that objectives are violated should be listed. The entire Bay, for example, should not be listed for mercury if only certain segments of the Bay exceed the mercury objective.

Listing general categories of constituents (e.g., pesticides, nutrients, pathogens, siltation, etc.) should be avoided in that it does not provide the specificity needed to develop a TMDL. Such categories do not identify specific pollutants or target concentrations. Moreover, the listing of categories would make it extremely difficult to measure success or to remove a water body from the list. For example, even after initially targeted pesticides are controlled, some may argue that other pesticides are now interfering with beneficial uses and therefore it is inappropriate to complete the TMDL process or to de-

list the water body. The appropriate approach is to list specific constituents with - identifiable, numeric targets and then later add constituents to the list if other constituents are found to cause exceedance of other standards.

3. The 303(d) list, at this time, should generally be based on the exceedance of numeric water quality objectives.

The 1995 Basin Plan, on page IV-7, indicates that TMDLs (i.e., allowable pollutant loads and wasteload allocations) will be based on numeric water quality objectives. The Basin Plan points out that additional objectives are necessary to fully implement the wasteload allocation approach and that the Board will establish additional objectives for selected pollutants as the necessary technical information becomes available and a framework for assessing economic factors is developed. BADA generally agrees with the approach set forth in the Basin Plan, with two exceptions. The first exception has to do with South Bay and the second has to do with toxicity exhibited in the northern parts of the estuary.

South Bay is unique first because there are no adopted objectives in place and second because there is an active watershed management process currently underway. As a part of the process, local stakeholders have agreed that a weight of evidence approach be used as a basis for listing. BADA supports listing of South Bay based on the weight of evidence approach. We support, in that case, using all applicable scientific data and information, including but not limited to water column concentration data, sediment data, tissue data, health advisories, toxicity data, and information on bioaccumulation.

With respect to toxicity, BADA would agree that it may be appropriate to list water bodies on the basis of violation of the narrative toxicity objective if those water bodies exhibit water column toxicity and if Toxicity Identification Evaluations (TIEs) have identified a causative constituent. The listing, in those cases, should be based on the violation of the narrative toxicity objective and the goal should be to eliminate water column toxicity.

The proposed 303(d) list, in contrast to the Basin Plan and the two exceptions discussed above, appears to base listings on a number of informal criteria and/or narrative objectives not directly related to water column toxicity tests. These include elevated sediment and tissue levels, fish advisories, and criteria that have not been formally adopted. The proposed list, therefore, is inconsistent with the approach set forth in the Basin Plan.

BADA acknowledges that EPA regulations require water bodies to be listed on the 303(d) list if the waters violate narrative standards. But, States have considerable discretion in determining whether narrative standards are being violated. Neither the Regional Board nor the State Board has adopted a straightforward approach for assessing whether narrative standards are being violated. Under California law, there are constraints to considering informal criteria as objectives or using such criteria to interpret

narrative objectives. California law (the Water Code and CEQA) require that objectives be based on consideration of economics and environmental considerations. The current narrative objectives in the Basin Plan were not adopted based on the consideration of the economic and environmental impacts associated with use of informal criteria to interpret compliance. Under these circumstances the reasonable approach is for the Regional Board to state that it has insufficient information to assess compliance with the narrative objectives and therefore has chosen not to list on that basis. This is essentially the approach proposed in the Staff Report for the "second general situation." Again, the exception would be where water column toxicity has been identified and where TIEs have identified the causative constituent.

There are several additional reasons why the 303(d) list should generally be based on violation of numeric water quality objectives:

- The CWA requires water bodies to be placed on the list only where water quality standards are being violated.
- Numeric objectives provide a specific target for TMDL development.
- Regulation based on numeric objectives that have been adopted pursuant to the requirements of the Water Code, CEQA, and the Administrative Procedures Act (APA) is legally supportable.
- On the contrary, regulation based on the use of informal criteria or action levels would have the effect of circumventing the requirements of the Water Code, CEQA, and the APA and are not legally supportable.

It is inappropriate to use National Toxics Rule (NTR) criteria for mercury, copper and nickel as a basis for listing, in that the NTR criteria for these constituents do not apply to California waters. It is inappropriate to use elevated sediment or tissue levels or fish advisories as a basis for listing, in that these are not based on adopted objectives. The only adopted objectives applicable to Bay Area waters are those contained in the Basin Plan and the NTR (selenium and a number of organic criteria in the NTR are applicable to California waters).

If the Regional Board chooses to use informal criteria as a basis for listing, then it is imperative that these criteria be specifically stated and it is necessary to address the requirements of the Water Code, CEQA and the APA in a manner that assures compliance with State law.

4. BADA recommends adoption of a limited 303(d) list.

As stated above, BADA recommends that, with two exceptions, the Regional Board place water bodies on the 303(d) list only where Regional Monitoring Program (RMP) or other

credible data demonstrate an exceedance of numerical water quality objectives contained in the Basin Plan or applicable sections of the NTR. The exceptions, as stated above, are for the South Bay, where a weight of evidence approach has been agreed to by stakeholders, and for those water bodies which have exhibited water column toxicity.

BADA has reviewed the RMP data for each of the Bay's main segments (not the tributaries to the Bay) for exceedances of numeric objectives contained in the Basin Plan or the NTR. These segments include South Bay, Lower Bay, Central Bay, San Pablo Bay, Carquinez Straight, Suisun Bay, and the Delta. The results of BADA's review are summarized in Attachment A. The RMP data are presented in Attachment B. As a result of BADA's review and previous discussions regarding South Bay and water column toxicity, BADA would recommend that the following Bay segments and constituents be listed on the 303(d) list:

- South Bay for copper, mercury, and nickel, based on the weight of evidence.
- San Pablo Bay for mercury, based on the Basin Plan objective of 0.025 ug/l, and for nickel, based on the Basin Plan objective of 7.1 ug/l.
- Carquinez Straight for mercury, based on the Basin Plan objective of 0.025 ug/l, and for nickel, based on the Basin Plan nickel objective of 7.1 ug/l.
- Suisun Bay for mercury, based on the Basin Plan objective of 0.025 ug/l, for nickel based on the Basin Plan nickel objective of 7.1 ug/l, and for the narrative toxicity objective based on aquatic bioassays.
- Sacramento River for the narrative toxicity objective based on aquatic bioassays.
- San Joaquin River for the narrative toxicity objective based on aquatic bioassays.

In listing the above segments for mercury and nickel, the list should include a statement that both these objectives are currently be revised in conjunction with the CTR and that upon adoption of the CTR the listing of these waters must be revisited. It should be noted that the proposed CTR criterion for nickel is currently achieved throughout the Bay except in South Bay, without consideration of a water effects ratio. The proposed CTR criteria for mercury is currently achieved 95% of the time except in South Bay.

It is unnecessary to list any waters for copper (other than South Bay) because the Basin Plan does not contain a saltwater objective for copper and the NTR copper criterion was not adopted for California waters.

It is unnecessary to list any major Bay segment for selenium in that the RMP data show that none of these segments exceed the NTR objective for selenium.

It is unnecessary to list any waters for the generic category of pesticides because there are no Basin Plan objectives, or other applicable objectives, for these constituents that are exceeded in Bay waters.

With respect to exceedance of the narrative toxicity objective, the RMP has identified water column toxicity in the northern part of the estuary (the Napa River, Grizzly Bay, the Sacramento River, and the San Joaquin River). To the extent that Toxicity Identification Evaluations (TIEs) have identified a causative constituent, BADA would agree that there is cause to list these specific water bodies for violation of the narrative toxicity objective. However, we do not support the listing of the other main segments of the Bay where water column toxicity has not been found.

It is unnecessary to list any other waters (than those discussed above) on the basis of violation of the narrative toxicity objective in the Basin Plan. First, to do so would be contrary to the previously cited provisions of the Basin Plan. Second, the Regional Board has the discretion to conclude that there is currently insufficient information to make a determination whether any narrative objective is violated. It is our understanding, that EPA headquarters recognizes the discretion of States to list or not list water bodies based on interpretation of narrative objectives.

In recommending that water bodies generally be listed only where numeric objectives are exceeded, BADA is not saying that mercury, copper, selenium, pesticides, or other toxic pollutants should be ignored. Nor are we saying that programs already underway to address these constituents should be stopped. On the contrary, the City of San Jose and other South Bay agencies remain committed to conducting a watershed management program and developing TMDLs for South Bay, and San Jose and other BADA agencies are committed to continuing and expanding pollution prevention efforts to address these constituents. What we are saying in recommending a limited 303(d) list is that, at this time, it is more appropriate to address those constituents through mechanisms other than the 303(d) list.

Although BADA's analysis and recommendations address only the Bay's major segments, we believe it would be prudent for the Regional Board to take a similar approach in listing tributary waters.

5. Conclusion

In conclusion, BADA believes that the Regional Board has the flexibility under the Clean Water Act to adopt a 303(d) list for the Bay's major segments consistent with what we have recommended. The constituents of concern not listed under the recommended approach can be addressed through other avenues (e.g., development of numeric objectives, watershed management, and pollution prevention programs). This approach would provide specific targets for TMDLs and be a legally supportable program. It would also minimize the resources that would otherwise be required for TMDL

Ms. Loretta Barsamian

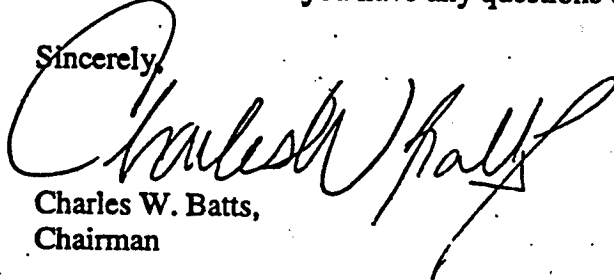
February 2, 1998

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development in the near term and prevent other potential adverse impacts on community growth and development.

Please contact me if you have any questions or if you need additional information.

Sincerely,



Charles W. Batts,
Chairman

Attachments (2)

cc: BADA Board Members
Don Birrer, Executive Director
Larry Walker, Larry Walker Associates
Walter Pettit, Executive Officer, SWRCB

ATTACHMENT A

Summary of Compliance with Numeric Water Quality Objectives

Bay Segment	Water Quality Objectives				
	Mercury	Copper	Nickel	Selenium	Pesticides
South Bay	N.A. (Violates CTR)	N.A. (Violates CTR)	N.A. (Violates CTR)	Complies w/NTR	N.A.
Lower Bay	Complies (Complies w/CTR)	N.A. (Complies w/CTR (95%))	Complies (98%) (Complies w/CTR)	Complies w/NTR	N.A.
Central Bay	Complies (Complies w/CTR)	N.A. (Complies w/CTR)	Complies (97%) (Complies w/CTR)	Complies w/NTR	N.A.
San Pablo Bay	Violates (Complies w/CTR (96%))	N.A. (Complies w/CTR)	Violates (Complies w/CTR)	Complies w/NTR	N.A.
Carquinez Straight	Violates (Complies w/CTR)	N.A. (Complies w/CTR)	Violates (Complies w/CTR)	Complies w/NTR	N.A.
Suisun Bay	Violates (Complies w/CTR (95%))	N.A. (Complies w/CTR)	Violates (Complies w/CTR)	Complies w/NTR	N.A.
Delta	Complies (Complies w/CTR)	Complies (Complies w/CTR)	Complies (96%) (Complies w/CTR)	Complies w/NTR	N.A.

Compliance based on numeric objectives in Basin Plan, except as noted.

N.A. – No numeric water quality applicable.

South Bay exceeds the proposed CTR criteria for copper and nickel if the water effects ratio is assumed to be 1.0 and exceeds the proposed CTR criteria for mercury.

There are no numeric objectives for diazinon or chlorpyrifos, but diazinon levels exceed recommended freshwater criteria throughout the Bay, and chlorpyrifos levels exceed recommended criteria in the Delta.

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D-035598

ATTACHMENT B

Regional Monitoring Program (RMP) Water Column Data

For Major Segments of San Francisco Bay System

Water Column Constituent Concentrations for South San Francisco Bay^{1,2}

Mercury (Total) Concentrations in South San Francisco Bay (ng/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Dumbarton Bridge	8.74	7.17	7.99	20.10	11.50	56.10	7.84	68.20	26.20	5.00	11.00	7.00
South Bay	10.02	13.69	5.36	12.10	16.20	13.10	7.82	29.10	19.00	7.00	11.00	17.00
Coyote Creek				37.60	2.70	28.40	20.80	105.60	15.80	9.00	21.00	18.00
San Jose				21.70	21.50	79.70	22.20	90.90	105.60	18.00	92.00	118.00
Sunnyvale				19.90	23.50	52.10	16.70	56.60	101.60	42.00	25.00	42.00

Copper (Total) Concentrations in South San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Dumbarton Bridge	3.25	3.58	3.48	4.09	5.20	6.17	3.21	7.19	5.20	3.00	4.00	3.80
South Bay	3.31	4.43	3.51	3.40	6.35	5.67	3.33	5.61	5.47	3.00	4.20	4.60
Coyote Creek				6.06	6.68	7.97	4.24	11.79	3.13	3.10	6.30	4.20
San Jose				4.18	7.14	13.05	4.86	10.68	10.74	4.30	12.30	12.90
Sunnyvale				4.30	5.32	5.56	3.82	90.90	11.13	8.00	7.20	6.70

Copper (DIS) Concentrations in South San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Dumbarton Bridge	2.52	3.08	2.82	2.32	3.72	3.67	2.78	2.80	3.74	2.00	2.40	3.00
South Bay	2.42	3.25	2.89	2.48	4.56	3.85	2.95	2.89	4.37	2.00	2.50	3.20
Coyote Creek				2.85	4.89	4.46	3.03	4.29	4.13	2.10	3.30	3.20
San Jose				2.67	5.93	4.09	3.48	4.05	3.87	2.50	4.60	2.10
Sunnyvale				1.96	4.80	2.71	1.76	4.01	4.29	1.40	3.70	3.10

Nickel (Total) Concentrations in South San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Dumbarton Bridge	4.00	4.30	4.52	7.02	5.74	7.73	4.16	13.03	7.96	3.60	4.70	4.50
South Bay	4.64	5.65	4.25	5.92	7.17	6.25	4.52	9.06	7.35	4.00	4.50	7.20
Coyote Creek				12.22	8.49	11.69	8.29	22.31	6.45	4.40	9.00	12.40
San Jose				10.98	14.24	36.03	11.13	22.67	23.70	4.00	21.70	10.70
Sunnyvale				9.86	9.66	10.23	6.11	11.81	23.47	18.70	10.80	16.70

Nickel (DIS) Concentrations in South San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Dumbarton Bridge	3.42	2.81	2.73	2.28	2.68	3.07	3.25	2.88	3.35	2.90	2.30	2.90
South Bay	3.56	2.94	2.79	2.37	3.51	3.37	3.49	3.10	4.41	2.80	2.40	3.00
Coyote Creek				3.70	4.06	4.64	4.50	4.74	3.90	3.30	2.90	6.60
San Jose				6.63	12.80	7.22	7.72	6.85	10.94	4.80	5.10	8.60
Sunnyvale				4.12	6.82	5.45	2.86	3.68	6.12	2.80	3.30	7.00

Selenium (Total) Concentrations in South San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Dumbarton Bridge	0.28	0.26	0.26	0.40	0.32	0.32	0.35	0.38	0.19	0.28	0.24	0.19
South Bay	0.37	0.41	0.3	0.38	0.33	0.23	0.42	0.40	0.29	0.30	0.33	0.22
Coyote Creek				0.42	0.36	0.35	0.61	0.66	0.22	0.50	0.22	0.74
San Jose				0.59	0.45	0.41	1.21	1.45	0.67	0.67	1.39	1.05
Sunnyvale				0.40	0.43	0.70	2.24	1.51	0.71	1.02	1.70	0.78

Diazinon (TOT) Concentrations in South San Francisco Bay (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Dumbarton Bridge				18469	5600	8400	<MDL	3905	<MDL	14000	5237	1900
Coyote Creek				98005	3700	2500	<MDL	3500	<MDL	12000	9830	
San Jose										36150	14230	8300

Chlorpyrifos (TOT) Concentrations in South San Francisco Bay (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Dumbarton Bridge	1005			780			105	81	3	15	113	38
Coyote Creek				2054			325	200	2	191	273	
San Jose										4110	870	105

1. Shaded values exceed criteria.
2. Bold values exceed CTR criteria

Water Column Constituent Concentrations for Lower San Francisco Bay ¹

Mercury (Total) Concentrations in Lower San Francisco Bay (ng/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Alameda				6.23	5.70	6.40	2.70	5.18	2.05	4.00	1.00	3.00
Oyster Point	3.30	4.64	7.70	12.70	5.80	4.04	4.78	1.38	2.61	4.00	2.00	3.00
San Bruno Shoal				13.90	5.30	15.30	4.44	6.50	5.82	4.00	2.00	16.00
Redwood Creek	4.42	3.88	4.88	5.63	9.80	8.56	5.10	9.59	9.53	6.00	6.00	10.00

Copper (Total) Concentrations in Lower San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Alameda				2.39	2.60	3.25	2.29	1.84	1.77	2.10	1.20	1.80
Oyster Point	2.35	2.15	2.45	2.89	3.19	3.16	2.49	1.66	1.57	2.40	1.30	1.60
San Bruno Shoal				3.19	3.55	3.56	2.61	2.58	2.78	2.40		4.00
Redwood Creek	2.99	2.16	3.02	2.64	4.28	4.33	2.81	3.22	3.17	2.70	2.80	3.70

Copper (DIS) Concentrations in Lower San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Alameda				2.10	1.90	2.31	2.02	0.99	1.48	1.40	1.10	1.50
Oyster Point	1.95	1.64	1.79	1.92	2.70	2.30	1.92	1.16	1.16	1.50	1.10	1.50
San Bruno Shoal				1.92	2.96	2.75	2.14	1.92	2.16	1.50	1.60	2.10
Redwood Creek	2.33	1.98	2.32	2.17	3.11	3.29	2.37	1.91	2.25	1.90	1.90	2.50

Nickel (Total) Concentrations in Lower San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Alameda				3.11	2.97	3.23	2.76	2.43	1.69	2.50	2.00	2.20
Oyster Point	2.62	2.40	3.38	4.43	3.24	2.86	3.29	1.68	1.57	2.80	1.20	2.20
San Bruno Shoal				4.77	3.53	3.31	3.22	2.91	3.07	2.60		6.20
Redwood Creek	10.37	2.50	3.87	3.47	4.85	4.23	3.54	4.52	3.88	3.60	3.10	5.20

Nickel (DIS) Concentrations in Lower San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Alameda				2.05	1.61	1.87	2.19	1.10	1.22	1.80	1.00	1.50
Oyster Point	2.38	1.75	1.76	1.95	1.83	2.15	2.21	1.31	1.09	1.90	1.00	1.50
San Bruno Shoal				1.86	2.32	2.23	2.26	1.88	1.99	1.90	1.40	2.20
Redwood Creek	3.2	2.1	2.37	2.19	2.68	2.67	2.70	2.04	1.97	2.90	1.90	2.40

Selenium (Total) Concentrations in Lower San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Alameda				0.29	0.28	0.21	0.17	0.19	<MDL	0.21	0.09	0.10
Oyster Point	0.13	0.17	0.22	0.33	0.29	0.33	0.15	0.18	0.08	0.12	0.08	0.12
San Bruno Shoal				0.25	0.29	0.38	0.12	0.25	0.11	0.15	0.13	0.14
Redwood Creek	0.18	0.28	0.25	0.19	0.29	0.28	0.18	0.25	0.13	0.16	0.24	0.10

Diazinon (TOT) Concentrations in Lower San Francisco Bay (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Alameda					1700	1200	<MDL	<MDL	<MDL	9337	1200	
Redwood Creek						1100	<MDL	<MDL	<MDL	7133	4720	1700

Chlorpyrifos (TOT) Concentrations in Lower San Francisco Bay (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Alameda				326			143	34	1	12	132	8
Redwood Creek	92			543			229	70	4	24	94	44

1. Shaded values exceed criteria.

Water Column Constituent Concentrations for Central San Francisco Bay¹

Mercury (Total) Concentrations in Central San Francisco Bay (ng/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Yerba Buena Is.	3.98	3.46	3.90	4.19	6.40	2.87	2.53	3.42	2.24	0.80		0.40
Point Isabel	5.99	4.20	10.05	5.70	3.10	2.32	3.04	19.40	2.62	1.40	0.60	0.60
Red Rock				4.50	2.50	4.31	6.67	12.40	4.79	1.70	0.50	0.70

Copper (Total) Concentrations in Central San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Yerba Buena Is.	2.45	1.61	1.66	1.68	2.34	2.02	2.27	1.80	1.33	1.50	1.20	1.40
Point Isabel	1.86	1.62	2.34	1.58	1.90	1.73	2.34	2.41	1.16	1.60	1.00	2.80
Red Rock				1.17	1.60	1.71	3.55	1.34	2.00	1.80	1.10	1.50

Copper (DIS) Concentrations in Central San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Yerba Buena Is.	1.94	1.23	1.18	1.26	1.42	1.49	1.89	0.96	1.09	1.50	1.20	1.40
Point Isabel	1.99	1.32	1.15	0.93	1.33	1.30	2.01	1.10	1.08	1.60	1.00	1.30
Red Rock				0.58	1.30	1.09	2.14	0.80	1.24	1.80	1.10	1.50

Nickel (Total) Concentrations in Central San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Yerba Buena Is.	2.74	1.79	1.46	2.14	3.21	2.06	2.81	2.63	1.43	2.30	1.20	2.50
Point Isabel	3.59	2.26	3.19	1.96	1.62	2.10	2.90	7.31	1.39	2.40	1.10	2.00
Red Rock				1.89	1.67	1.92	5.04	1.91	2.56	4.30	1.30	2.20

Nickel (DIS) Concentrations in Central San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Yerba Buena Is.	2.41	1.18	1.01	1.38	1.66	1.48	2.09	1.13	0.99	1.70	1.00	1.30
Point Isabel	2.49	1.29	1.08	1.02	1.15	1.12	2.16	1.21	0.97	2.10	1.00	1.30
Red Rock				0.76	1.20	1.17	2.22	0.98	1.21	2.20	1.00	1.40

Selenium (Total) Concentrations in Central San Francisco Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Yerba Buena Is.	0.13	0.23	0.28	0.39	0.27	0.27	0.07	0.18		0.30	0.11	0.09
Point Isabel	0.19	0.18	0.23	0.32	0.25	0.17	0.08	0.18		0.17	0.07	0.12
Red Rock				0.37	0.27	0.33	0.08	0.13		0.15	0.17	0.14

Diazinon (TOT) Concentrations in Central San Francisco Bay (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Yerba Buena Is.					2800	540	<MDL	<MDL		13000	1700	
Red Rock					1900	240	<MDL	<MDL	<MDL	32000	2107	1300

Chlorpyrifos (TOT) Concentrations in Central San Francisco Bay (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Yerba Buena Is.	1210			2185			67	69	2		151	
Red Rock				231			70	12	3	13	148	28

1. Shaded values exceed criteria.

Water Column Constituent Concentrations for San Pablo Bay^{1,2}

Mercury (Total) Concentrations in San Pablo Bay (ng/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
San Pablo Bay	6.44	63.51	19.85	9.60	47.40	33.10	3.94	43.50	6.97	9.00	5.00	6.00
Pinole Pt.	6.07	27.11	6.44	18.30	31.10	27.00	7.08	13.80	4.38	8.00	9.00	5.00

Copper (Total) Concentrations in San Pablo Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
San Pablo Bay	3.17	10.29	6.42	2.71	8.68	7.98	2.86	10.04	2.45	4.10	2.30	2.40
Pinole Pt.	2.92	6.47	3.08	3.27	6.78	6.01	2.56	5.46	2.03	3.30	3.40	2.80

Copper (DIS) Concentrations in San Pablo Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
San Pablo Bay	2.54	1.90	1.30	1.50	2.12	1.88	1.56	1.55	1.61	2.00	1.50	1.80
Pinole Pt.	2.30	1.64	1.55	1.30	1.84	1.99	1.66	1.37	1.49	1.80	1.50	1.70

Nickel (Total) Concentrations in San Pablo Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
San Pablo Bay	5.17	15.98	7.55	4.12	11.90	9.98	3.96	18.36	3.31	6.30	2.60	3.10
Pinole Pt.	4.18	9.60	2.8	4.68	10.36	6.83	3.77	9.81	2.73	4.60	4.60	3.50

Nickel (DIS) Concentrations in San Pablo Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
San Pablo Bay	3.73	1.92	1.35	1.47	1.63	1.84	2.02	1.69	1.43	2.70	1.40	1.60
Pinole Pt.	3.60	1.62	1.46	1.36	1.58	1.97	2.11	1.22	1.38	2.60	1.50	1.70

Selenium (Total) Concentrations in San Pablo Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
San Pablo Bay	0.113	0.21	0.27	0.25	0.25	0.21	0.16	0.30		0.17	0.16	0.08
Pinole Pt.	0.159	0.23	0.35	0.39	0.22	0.20	0.18	0.17	0.10	0.19	0.17	0.12

Diazinon (TOT) Concentrations in San Pablo Bay (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
San Pablo Bay				11497		650	<MDL	2410	<MDL	31190	4026	1800
Pinole Pt.				43957	1200	480	<MDL	2205	<MDL	43140	4034	2200

Chlorpyrifos (TOT) Concentrations in San Pablo Bay (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
San Pablo Bay	116			734			66	205	4	10	289	94
Pinole Pt.	89			640			66	195.5	1	4	338	41

1. Shaded values exceed criteria.
2. Bold values exceed CTR criteria.

Water Column Constituent Concentrations for Carquinez Strait¹

Mercury (Total) Concentrations in Carquinez Strait (ng/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Davis Pt.	5.51	11.18	11.01	8.40	12.70	14.10	20.80	38.10	6.74	1.70		5.00
Pacheco Cr.	18.3	26.2	14.99	6.00	33.10	16.40	11.60	9.45	7.04	2.60	9.00	9.00

Copper (Total) Concentrations in Carquinez Strait (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Davis Pt.	3.09	4.00	4.41	2.44	4.06	4.85	7.55	10.16	2.58	1.90	1.30	1.90
Pacheco Cr.	4.27	7.66	5.47	2.49	7.86	6.27	5.68	5.10	2.90	1.90	1.20	2.10

Copper (DIS) Concentrations in Carquinez Strait (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Davis Pt.	2.36	1.83	1.82	1.54	2.20	2.57	1.93	1.41	1.62	1.90	1.30	1.90
Pacheco Cr.	2.65	1.89	1.96	1.96	2.69	2.74	1.99	1.49	1.71	1.90	1.20	2.10

Nickel (Total) Concentrations in Carquinez Strait (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Davis Pt.	4.50	5.37	5.84	3.60	5.15	6.03	12.34	15.69	3.51	8.60	8.80	4.90
Pacheco Cr.	4.84	10.87	5.21	3.00	10.20	6.58	7.77	6.21	3.03	7.10	2.80	5.30

Nickel (DIS) Concentrations in Carquinez Strait (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Davis Pt.	3.75	1.43	1.58	1.56	1.68	2.15	2.22	1.75	1.46	2.20	1.30	1.80
Pacheco Cr.	2.64	1.38	1.40	1.71	1.69	1.91	1.48	1.24	1.09	2.70	1.00	1.60

Selenium (Total) Concentrations in Carquinez Strait (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Davis Pt.	0.13	0.18	0.32	0.25	0.21	0.22	0.14	0.26	0.14	0.18	0.21	0.15
Pacheco Cr.	0.17	0.19	0.26	0.28	0.18	0.08	0.12	0.32	0.09	0.14	0.12	0.16

Diazinon (TOT) Concentrations in Carquinez Strait (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Davis Pt.	410			10688	4500	1100	1050	2210	<MDL	44320	4864	2400

Chlorpyrifos (TOT) Concentrations in Carquinez Strait (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Davis Pt.				489			38	260	7	1253	416	57

1. Shaded values exceed criteria.

Water Column Constituent Concentrations in Suisun Bay^{1,2}

Mercury (Total) Concentrations in Suisun Bay (ng/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Grizzly Bay	14.61	12.40	33.01	122.60	41.20	135.50	9.33	29.90	10.30	1.10	5.00	29.00
Honker Bay				6.16	25.60	10.20	8.42	14.00	15.40	9.00	4.00	24.00

Copper (Total) Concentrations in Suisun Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Grizzly Bay	6.21	4.49	11.54	3.28	10.94	9.07	4.95	9.05	3.46	5.10	2.80	6.50
Honker Bay				3.05	7.87	4.81	4.91	5.39	4.58	4.70	2.10	7.10

Copper (DIS) Concentrations in Suisun Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Grizzly Bay	2.76	1.95	2.01	2.15	2.75	2.63	1.83	1.66	1.76	1.80	1.30	2.00
Honker Bay				2.10	2.56	2.40	1.95	1.78	1.56	1.80	1.20	1.80

Nickel (Total) Concentrations in Suisun Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Grizzly Bay	8.7	4.98	9.89	3.99	16.41	10.90	6.52	13.68	3.93	10.60	3.20	9.80
Honker Bay				2.85	8.41	4.41	6.19	7.02	5.75	10.70	2.10	12.00

Nickel (DIS) Concentrations in Suisun Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Grizzly Bay	3.03	1.02	1.20	1.8	1.63	1.88	1.50	1.35	1.12	2.00	1.00	1.40
Honker Bay				1.34	1.25	1.58	1.77	1.53	0.87	1.90	1.00	1.10

Selenium (Total) Concentrations in Suisun Bay (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Grizzly Bay	0.12	0.21	0.25	0.34	0.24	0.20	0.13	0.17	0.07	0.14	0.14	0.17
Honker Bay				0.28	0.19	0.16	0.16	0.20	0.11	0.15	0.11	0.14

Diazinon (TOT) Concentrations in Suisun Bay (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Grizzly Bay				14786	6200	1700	<MDL		<MDL	58350	5000	6400

Chlorpyrifos (TOT) Concentrations in Suisun Bay (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Grizzly Bay				391			37	82		404	436	15

1. Shaded values exceed criteria.
2. Bold values exceed CTR criteria.

D-035611

Water Column Constituent Concentrations for the Delta¹

Mercury (Total) Concentrations in the Delta (ng/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Sacramento River	10.26	5.95	9.98	5.00	12.60	4.50	6.57	8.78	4.82	6.00	3.00	7.00
San Joaquin River	10.59	8.13	11.36	5.10	14.60	4.36	7.60	7.31	6.29	6.00	2.00	7.00

Copper (Total) Concentrations in the Delta (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Sacramento River	5.23	3.35	3.74		5.82	3.44	4.68	4.30	2.62	3.90	2.20	3.30
San Joaquin River	5.31	3.90	4.12	3.01	3.82	3.28	4.16	3.14	2.77	3.50	2.10	3.30

Copper (DIS) Concentrations in the Delta (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Sacramento River	2.69	1.38	1.62	1.80	2.30	2.16	1.86	1.52	1.47	1.60	0.90	1.50
San Joaquin River	2.94	1.71	1.70	2.25	2.24	2.11	2.34	1.62	1.55	2.20	1.20	1.70

Nickel (Total) Concentrations in the Delta (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Sacramento River	6.66	3.2	3.45	2.52	5.75	2.85	6.35	4.94	2.70	7.60	2.50	3.90
San Joaquin River	6.52	3.38	4.03	2.50	3.82	2.17	4.75	3.13	2.55	4.60	1.80	3.80

Nickel (DIS) Concentrations in the Delta (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Sacramento River	2.79	0.72	0.73	1.04	1.26	1.32	1.56	0.99	0.99	2.20	0.80	0.09
San Joaquin River	2.76	0.68	0.75	1.24	0.99	1.00	1.79	1.33	0.72	2.40	0.90	1.00

Selenium (Total) Concentrations in the Delta (ug/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Sacramento River	0.20	0.15	0.24	0.30	0.25	0.16	0.14	0.11		0.16	0.07	0.11
San Joaquin River	0.16	0.20	0.27	0.25	0.22	0.06	0.13	0.33	0.06	0.18	0.18	0.10

Diazinon (TOT) Concentrations in the Delta (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Sacramento River				46629	2500	1400	<MDL	<MDL	ND	26000		4500
San Joaquin River				35259		1200			<MDL	25000		3200

Chlorpyrifos (TOT) Concentrations in the Delta (pg/L)

Site	1993			1994			1995			1996		
	Cruise 1	Cruise 2	Cruise 3	Cruise 4	Cruise 5	Cruise 6	Cruise 7	Cruise 8	Cruise 9	Cruise 10	Cruise 11	Cruise 12
Sacramento River				1416			29	35	10	321		38
San Joaquin River				6400			92		10	440		34

1. Shaded values exceed criteria.

Post-It* Fax Note	7871	Date	1-9-98	# of pages	2
To	Thomas Mumley	From	Bruce Holliman		
Co./Dept.	RWQCB	Co.			
Phone #		Phone #			
Fax #		Fax #			

9 January 1998

Mr. Thomas Mumley
SFRWQCB
2101 Webster Street, Suite 500
Oakland, CA 94612

Subject: Comments on Proposed Revisions to Section 303(d) List and Priorities for Development of TMDLs for the SF Bay Region

Dear Mr. Mumley:

I have reviewed the staff report for the subject proposal. Continued listing of the Petaluma River as an impaired waterway is of particular concern to me. I would appreciate responses to the following questions/comments:

- 1) The 2nd paragraph of the "Introduction" of the staff report indicates that the bulk of the data used in the listing process was the RMP. The RMP does not include any sampling points within the Petaluma River, only one point near its mouth. Please describe the additional data, if any, that was reviewed for the Petaluma River in making your listing decision.
- 2) The Petaluma River does not include causes of listing associated with pesticides or metals, only nutrients, pathogens, and siltation (just as in 1996). Does this indicate that the Petaluma River does not have problems associated with pesticides and metals? Or does it indicate a lack of data for these pollutants?
- 3) Regarding pesticides: a statement is made on page 4 that "efforts are underway to develop control strategies for both urban runoff and agricultural sources." Please describe these efforts, particularly as they relate to diazinon and chlorpyrifos.
- 4) Is ammonia toxicity, particularly as associated with runoff from livestock operations, considered in the listing process? Does data for ammonia toxicity exist for the Petaluma River?
- 5) In the "Introduction," it is indicated that the second step in the assessment process

Mr. Thomas Mumley
9 January 1998
Page 2

includes a data compilation process and that the information compiled is available for review by interested parties. Where is it available for review?

- 6) What is the basis for listing Lake Herman for mercury? Has testing of water or sediments been conducted? Please describe the available data.

Thank you for your consideration of these comments and questions. I will not be able to attend the 18 February 1998 public hearing, and would appreciate written or e-mail responses.

Sincerely,

Bruce Abelli-Amen
101 H Street, Suite L
Petaluma, CA 94952

e-mail: baseline@crl.com

3. The proposed listing relies on qualitative qualifiers such as "exceedances" and "elevated" levels to support the listing of stressors. To be useful, the listing should be expanded to include columns on the list for whether the identified stressor was included based on water column, sediment, and/or tissues impacts and the frequency and level of individual regulatory criteria exceedances.
4. A number of the listed sources rely on using the generic term "other." To be useful, the listing should specifically identify sources. Lacking a clear definition of sources implies that additional data may be required before a listing should be made. This is especially true for high priority listings.
5. It is unclear how the draft 303(d) listing and associated schedules are related to the Regional Board's July 1997 draft Watershed Management Initiative guidance report. It would appear reasonable to use the guidance document as a basis to identify where additional data/investigations are required and then establish the program to fill these gaps. These data would then be used to update the State's 305(b) Water Quality report and where appropriate the 303(d) list which is updated every 2 Years.
6. The level 2 or medium priority ranking indicates that RWQCBs should provide schedules for TMDLs to be initiated over the next five years. It would be helpful if the Regional Board could provide a definition for the term "initiate." In addition, the 303(d) includes TMDL "start" and "end" dates. It would be helpful if the Regional Board could provide a clear definition of these terms.
7. The proposed listing includes several reservoirs and creeks located in Santa Clara county. Mercury is listed as the stressor and the priority is shown as high. The data to support the specific listings should be provided and cited in the list.
8. The Regional Board staff needs to consistently follow the ranking criteria used for preparing the list and for specifying the priority ranking. All technical data used to develop and support the list should be referenced in the list, thus providing a complete and clear administrative record of the Board's actions.

As you know, EPA is currently facing over 20 lawsuits from environmental groups that claim EPA and various states have not fulfilled their obligations under the Clean Water Act. Because of the federal Clean Water Act implications that result from the 303(d) listing it is important that the Regional Board and its' staff have a clear technical basis that supports the listing and have identified the resources to conduct the required TMDL.

We hope that the above comments and recommendations are useful to the Board's efforts and look forward to your response. If you need any additional clarification please do not hesitate to contact me.

Sincerely,



Adam W. Olivieri, Dr.PH, P.E.
Program Manager

□ 505 W. Olive Avenue, Suite 635 • Sunnyvale, CA 94086 • tel: (408) 720-8811 fax: • (408) 720-8812
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REGIONAL MONITORING PROGRAM										
Diazinon Water Column Data for 1994-1996										
	Dumbarton Br. (BA30)		Coyote Cr. (BA10)		San Jose (C-3-0)		Standish Dam (BW10)		Sunnyvale (C-1-3)	
	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total
Date	(ng/l)	(ng/l)	(ng/l)	(ng/l)	(ng/l)	(ng/l)	(ng/l)	(ng/l)	(ng/l)	(ng/l)
7/30 or 8/16/96	1.9	1.9	*	*	8.3	8.3	14.0	14.1	N/A	N/A
5/1 or 4/16/96	5.2	5.2	9.7	9.85	14.0	14.2	7.8	R	N/A	N/A
2/6 or 3/4/96	14.0	14.0	12.0	12.0	36.0	36.1	9.3	9.4	N/A	N/A
8/15/95	2.2	2.2	2.9	2.9	N/A	N/A	N/A	N/A	N/A	N/A
4/24/95	7.3	7.8	5.8	7.0	N/A	N/A	N/A	N/A	N/A	N/A
2/6/95	8.7	8.7	7.7	7.7	N/A	N/A	N/A	N/A	N/A	N/A
8/15/94	8.4	8.4	2.5	2.5	N/A	N/A	N/A	N/A	N/A	N/A
4/18/94	5.6	5.6	3.7	3.7	N/A	N/A	N/A	N/A	N/A	N/A
1/31/94	18.4	18.4	97.6	98.0	N/A	N/A	N/A	N/A	N/A	N/A
Notes:	* - data not available at the time of draft report production.									
	N/A - organophosphates were not analyzed as part of the RMP for this									
		station.								
	R - unacceptably low surrogate recovery (lab problem)									
The 1993 RMP Annual Report did not contain diazinon water column data.										
Trace organics were not measured in water at the South Bay station (BA20).										

**Santa Clara
Valley Urban
Runoff Pollution
Prevention Program**

January 30, 1998

Dr. Tom Mumley
Senior Water Resources Control Engineer
Regional Water Quality Control Board
2101 Webster St. Suite 500
Oakland CA 94612

Subject: Comments on Proposed Revisions to Section 303(d) List and Priorities for Development of Total Maximum Daily Loads (TMDLs) for the San Francisco Bay Region - January 7, 1997

Tom:
Dear Dr. Mumley:

The Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) has reviewed the draft 303(d) list and offers the following comments and recommendations:

1. We support your efforts to clearly specify in the draft 303 (d) list which metals are considered to impair water-bodies in different locations of San Francisco Bay, in particular the South San Francisco Bay. Because past Regional Board information simply used "metals" as the description of this pollutant of concern it has led to confusion relative to addressing real problems. The draft list will better focus available resources on the true problem metals rather than waste limited Regional Board and local resources on non-problems or problems where "there is insufficient information to determine if a TMDL process would afford better water quality protection than existing local requirements..." (Page 2 of Regional Board Staff Report).
2. The Regional Board's staff report assessment process includes three "general situations" for ranking stressors and water-bodies. The third category includes the situation where specific stressors and specific water-bodies can be identified and where a TMDL is technically feasible. The Regional Board staff clearly state that "Only those water bodies and stressors in the third general category have been included in the final 303(d) list." (Page 2 of the Regional Board Staff Report) We agree with this approach. However, as discussed below this approach has not been consistently followed by the staff in preparing the draft list.

Category two was defined to cover the situation where "insufficient information [is] available to determine if a TMDL process would afford better water quality protection than existing local requirements for water quality based effluent limitations and Best Management Practices." However, the draft list includes the broad category of pesticides. We do not support the inclusion of the new category "pesticides" as a cause of impairment of South San Francisco Bay because there is no information that shows that pesticides exceed water quality objectives or are the cause of toxicity.

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Specifically, available data on diazinon and chlorpyrifos have not been shown to cause water quality toxicity in these areas. This conclusion is based on the following:

- The Regional Monitoring Program measured diazinon concentrations approximately nine times in the water column from two South Bay main water mass stations and two shallow water stations between 1994 and 1996. The highest concentration of diazinon recorded was 36.1 ng/l at shallow water station (C-3-0, see enclosed Table summarizing the Regional Monitoring Program's data). This concentration is more than 5.5 times lower than the 200 ng/l concentration that is reported to cause acute toxicity in the amphipod *Gammarus fasciatus* (Table 4-2 in "Diazinon in Surface Waters in the San Francisco Bay Area: Occurrence and Potential Impact, Regional Board June 1997). This amphipod is shown as the most sensitive species to diazinon in the above-mentioned report. This report also concludes that diazinon "less than 150 ng/l is not expected to cause mortality" (page ES-8).
- The above mentioned Regional Board report concludes, in part, as follows: "Because the adverse impact of diazinon will depend on the specific circumstances of a receiving water, it is impossible to draw a general conclusion that diazinon presence in our urban creeks constitutes an ecological problem."

The Regional Board's listing criteria do not support including either the broad group of pesticides or specific pesticides such as diazinon and chlorpyrifos at this time. Further, identifying point and urban runoff/stormwater, as key sources to control would not solve the perceived pesticide issue. The SCVURPPP's member agencies do not use these pesticides in substantive quantities, nor do they manufacture, formulate, or sell these pesticides. The member agencies could not control or regulate the use and sale of these pesticides, even if they wanted to because they are statutorily pre-empted by the federal and state government from doing so. Despite these difficult limitations, the SCVURPPP has supported the Bay Area Stormwater Management Agencies' regional advertising campaign on proper pesticide use, has sponsored special studies to investigate the pesticides in receiving waters, and remains committed to helping implement educational efforts.

We strongly recommend that the Regional Board not list pesticides as a stressor. However, if the Regional Board believes that it must include pesticides on its 303(d) listing we recommend the following:

- that only specific pesticides such as diazinon and chlorpyrifos be listed,
- that the priority be changed from medium to low,
- that the listing state that the Board intends to work with the Department of Pesticide Regulation and the businesses responsible for manufacturing, formulating, selling, or using these pesticides to investigate possible controls, and
- that the category "nonpoint source" be added as a source and urban runoff/storm sewers be deleted as a source in Table A1 of the 1998 303(d) and TMDL Priority List for San Francisco Bay Region.



Friends of Corte Madera Creek Watershed

Post Office Box 415 Larkspur, California 94977

February 2, 1998

CALIFORNIA REGIONAL WATER
FEB - 5 1998
QUALITY CONTROL BOARD

Regional Water Quality Control Board
2101 Webster Street, Rm. 500
Oakland, CA 94612

ATTN: TOM MUMLEY

Dear Board Members:

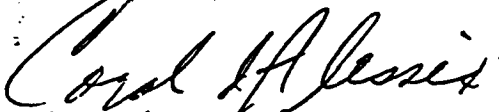
The Friends of Corte Madera Creek Watershed requests that Corte Madera Creek be evaluated for possible inclusion on the 303(d) list of impaired water bodies for the San Francisco Bay Region.

As you may be aware, we are a 501(c)(3) organization established three years ago for the purpose of enhancing and restoring Corte Madera Creek and its tributaries. We expect to begin a process of developing a plan for our watershed next year, with the assistance of a 205(j) grant.

Several years ago, the Regional Board conducted a series of water quality tests and subsequently also did additional testing for diazinon on Corte Madera Creek. We want to ensure that these existing data are considered, and that additional monitoring be conducted, if warranted, to ensure accurate assessment of our water body.

Thank you for considering our request.

Sincerely,



Carol d'Alessio
Co-Chair



Sandra Guldman
Co-Chair



CITY HALL • 250 EAST L STREET • BENICIA, CA 94510 • (707) 746-4200 • FAX (707) 747-8120

Public Works Department

February 4, 1998

Dr. Tom Mumley, Senior Water Resources Control Engineer
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street Suite 500
Oakland, CA 94612

SUBJECT: RESPONSE TO PROPOSED UPDATE OF THE REGIONAL WATER QUALITY ASSESSMENT OF THE 303 (D) LIST OF IMPAIRED WATER BODIES WITHIN THE SAN FRANCISCO BAY REGION.

Dear Dr. Mumley:

This letter is in response to the proposed update of the Regional Water Quality assessment of the 303 (d) list of impaired water bodies within the San Francisco Bay region. A small man-made lake, Lake Herman, is on the list due to mercury contamination and is found under the Solano County section as Herman Lake. The City is requesting to delist Lake Herman from the 303 (d) list and is submitting the most recent data for samples taken in the water column of Lake Herman.

The City recognizes that the present list is a historical listing and requests the opportunity to delist. If the water column data I have included is insufficient, will additional fish tissue, sediment, or water column data be required? The City wishes to review the data upon which the decision was based to list Lake Herman as an impaired water body. According to our records, no sediment samples have been analyzed. One fish tissue survey was conducted by the Department of Fish and Game in July of 1986 and largemouth bass collected during the survey were found to contain over 1 ug/g of fresh weight mercury.

Thank you for considering our request. I look forward to your reply. If you have any questions, please feel free to call me at (707) 746-4338.

Sincerely,

Victoria G. Shidell

Victoria G. Shidell
Water Quality Supervisor

VGS:dg//t/pubworks/Vicki/WWTPRWQCB/rr.298
file:WWTP/CRWQCB Correspondence

Attachments

cc: Chris Tomasik, Utilities Manager
Rob Shirley, Water Treatment Plant Superintendent
File Copy

JERRY HAYES, Mayor
Members of the City Council
STEVE MESSINA, Vice Mayor

OTTO WM. GIULIANI, City Manager
VIRGINIA SOUZA, City Treasurer

D - 0 3 5 6 2 0

D-035621

City of Benicia - Lake Herman Water Quality Summary 1993 - 1997

Constituent	DLR	1993	1994	1995	1996	1997	Maximum	Minimum	Average	MCL
Total Hardness, as CaCO ₃		220	130			110	220	110	153.3	
Total Alkalinity		188	110			110	188	110	136.0	
Turbidity, NTU		40	7			29	40	7	25.3	
Nitrite	0.4	0	0	0	0	0	0	0	0.0	
Nitrate	0.4	0.5	1.8	0.7	0.52	0.6	1.8	0.5	0.8	
Phosphate	0.1					0.2	0.2	0.2	0.2	
Sulfate		60	35			30	60	30	41.7	
Chloride		45	30			20	45	20	31.7	
Coliform, Total MPN/100ml							ERR	ERR	ERR	
Coliform, Fecal MPN/100ml							ERR	ERR	ERR	
Asbestos, MFL	0.01	9.13					9.13	9.13	9.1	TMFL
Radioactivity, pCi/L		1.89	(Total Alpha)				0	0	0.0	
pH, units		8	7.8			7.7	8	7.6	7.8	
Conductivity, umho/cm		620	410			340	620	340	456.7	
Total Dissolved Solids		390	250			220	390	220	286.7	
Apparent Color, units		100	120			90	120	90	103.3	
Odor Threshold		2	4			8	8	2	4.7	
MBAS	0.5	0	0			0	0	0	0.0	
Aluminum	0.01	0.54	0.21			1.7	1.7	0.21	0.8	1
Antimony			0			0	0	0	0.0	
Arsenic	0.002	0	0			0.005	0.005	0	0.0	0.05
Barium	0.1	0.11	0			0	0.11	0	0.0	
Beryllium	0.01		0			0	0	0	0.0	
Cadmium	0.001	0	0			0	0	0	0.0	0.01
Chromium	0.01	0	0			0	0	0	0.0	0.05
Copper	0.05	0	0			0	0	0	0.0	1
Iron	0.1	0.8	0.47			1.2	1.2	0.47	0.8	0.3
Lead	0.005	0	0			0	0	0	0.0	0.05
Manganese	0.03	0.07	0			0	0.07	0	0.0	0.05
Mercury	0.0002	0				0	0	0	0.0	0.002
Nickel	0.01		0			0	0	0	0.0	
Selenium	0.002	0	0			0.005	0.005	0	0.0	0.01
Silver	0.01	0	0			0	0	0	0.0	0.05
Thallium			0			0	0	0	0.0	
Zinc	0.05	0	0			0	0	0	0.0	5
Cyanide	0.01					0	0	0	0.0	0.2

Notes: All data reported in mg/L unless otherwise noted.
DLR - Detection Limit Required (by DHS)
MCL - Maximum Contaminant Level (as established by Title 22)
Constituents reported as zero were found to be less than the detection limit required (DLR).

1993 - The following organic scans were performed with one detectable result: EPA Method 524.2, 504, 505, 525, 507, 515.1, 531.1, and 547.
1994 - The following organic scans were performed with one detectable result: EPA Methods 504, 515.1, 548, 549, 613, and 632
1995 - Only vulnerability monitoring was conducted with no constituents detected: EPA Methods 507, 508, 515.1, and 547.
1996 - Only vulnerability and unregulated organics monitoring was conducted with no constituents detected: EPA Methods 507, 508, 515.1, and 547.
1997 - Only vulnerability and unregulated organics monitoring was conducted with no constituents detected: EPA Methods 507, 508, 515.1, and 547.
1997 - MTBE was analyzed and not detected.

\\pww\ick\WTP\Herm\WQ.wb2

Table 5-2. Lake Herman Water Quality Summary.

Constituent	Outlet tower(a)				Between outlet tower and Lake Herman Road(a)				Treatment plant raw water(b,c)			
	Minimum	Maximum	Mean	Count	Minimum	Maximum	Mean	Count	Minimum	Maximum	Mean	Count
Total hardness, mg/L as CaCO ₃	140	316	223	27	140	394	226	27	126	264	183	5
Turbidity, NTU	4	88	19	27	4	160	26	27	--	--	--	0
Nitrite, mg/L	0	0	0	27	0	0	0	27	--	--	--	0
Nitrate, mg/L as N	0	2.68	0.16	27	0	1.19	0.11	27	<0.01	0.61	0.17	6
Orthophosphates, mg/L	0	1	0	27	0	1	0	27	--	--	--	0
TDS, mg/L	180	414	308	27	192	414	309	27	210	440	319	5
Chloride, mg/L	32	58	43	17	32	63	41	17	13	61	37	5
Coliforms, MPN/100 ml	16	1600	50(d)	27	8	2400	50(d)	27	1.9	500	22.5(d)	38
Arsenic, mg/L	--	--	--	0	--	--	--	0	<0.001	<0.001	<0.001	5
Barium, mg/L	--	--	--	0	--	--	--	0	<0.1	<0.1	<0.1	4
Cadmium, mg/L	--	--	--	0	--	--	--	0	<0.0001	<0.01	--	4
Chromium, mg/L	--	--	--	0	--	--	--	0	0.0007	<0.02	0.0063	4
Copper, mg/L	--	--	--	0	--	--	--	0	<0.01	0.11	0.033	4
Iron, mg/L	0	5	1	27	0	3	0	27	<0.01	5.6	1.7	4
Zinc, mg/L	--	--	--	0	--	--	--	0	<0.001	0.067	0.018	4
Mercury, mg/L	0.0002	0.0002	0.0002	1	0.0005	0.0005	0.0005	1	<0.0001	0.0002	0.0001	4
Selenium, mg/L	--	--	--	0	--	--	--	0	<0.001	<0.001	<0.001	4
Silver, mg/L	--	--	--	0	--	--	--	0	<0.0001	<0.01	--	4

a) Period of record is February 1986 through July 1987.

b) Period of record is February 1983 through July 1986.

c) Title 22 organics were analyzed annually from 1984-1986 and 1990. No organics were detected during this period.

d) Median value.

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